The year of COVID put the Curie spirit to the test

There has never been a year like 2020. Despite the restrictions and difficulties, our staff all rolled up their sleeves and worked hard, ensuring that Institut Curie continued to fulfill its care, research, conservation and teaching missions.

Despite these challenging months, our dedication never wavered – not for one single day. Solidarity, cohesion, responsiveness, and adaptability underpinned the work of all those involved with Institut Curie.

Despite the lockdown, the Research Center still managed to get a score of approximately fifteen new research programs into COVID-19 off the ground, all while continuing its other scientific research.

As regards the Hospital Group, it began putting systems in place to protect its staff and patients right back in March 2020. Those systems were indispensable for ensuring the continued treatment of our cancer patients.

As for our colleagues at Head Office, they maintained operations remotely at the institute and kept our projects moving forward.

Throughout this period, it was the help of the government and partners, and the dedication of our donors and patrons that kept these activities up and running. We wish to express our utmost gratitude for their unfailing support.

Although 2021 has not brought the end of the coronavirus pandemic, 2020 showed us that the Curie spirit endures, as ever 100 years later. That spirit drives us each and every day. It is our strength and our hope for the future and for continuing our fight against cancer.

Prof. Thierry Philip, chairman of the Executive Board
Prof. Alain Puisieux, director of the Research Center
Prof. Pierre Fumoleau, director of the Hospital Group
Jacques Gilain, director of Head Office
What is your abiding memory of 2020?

The year 2020 was one of great upheaval for Sylvie, Franck, Stéphane, and Mohamed, as it was for many of their colleagues at Institut Curie. Here they look back on a year that brought not just its fair share of challenges, but learning too.

Franck Perez, Head of the Cell Biology and Cancer unit – UMR114

"We weren’t ready to be locked down, to have to close the Research Center, or to transform how we work so that we could do it remotely. I may be a biologist, but when the pandemic started, my first priority became logistics. We had to close the labs, get teams to stop their work, and halt research projects. But we still managed to do our best to complete vital experiments to preserve our most valuable experimental models and organize weekly remote meetings. And then, slowly, we got back to work in the labs. My second priority was to manage the impact of the crisis on our staff, particularly its psychological repercussions. So, I had to become a manager too. And I learned that it is not easy to manage teams remotely.

My third priority was to look after the scientific research. Some projects were delayed, others were reorganized, and some were even canceled when the first lockdown ended. Despite all these challenges, I am impressed by the quality of our publications in major scientific journals. The pandemic underscored just how constant research can be. Research is fragile, it moves, and you cannot simply stop and then pick up where you left off. Research is an investment in a shared, global knowledge."

"The plus point of the pandemic? To be fortunate enough to be part of such a team and work with people who have such a positive attitude.

We got so little negative feedback, even though people were suffering. It was a real joy to witness that solidarity, that unity, within the groups and between the teams."

Sylvie Arnaud, Director of Care

"We found out what a global health emergency is truly like. Our role as a hospital was to manage the crisis and rise to the challenge of not one, not two, but three waves. One thing I remember from the first wave of the pandemic was a great sense of solidarity. On the downside, there was also a temporary ban on patient visitors that the Regional Health Agency brought in for safety reasons. That was really hard on everyone. During the second wave, the hospital allowed visitors and associations back in to a certain extent. We liaised with patients, healthcare users, and partners through videoconferencing technology. They backed us and we took their suggestions on board.

We also noticed how digital technology has transformed care pathways. Telehealth appointments are a notable example. Two associations gave us computer tablets so that patients could communicate with their families. You could feel the solidarity. Many wonderful gestures of support from outside the hospital helped the staff to cope day-to-day. Another positive was the recognition of healthcare personnel and their work as well as that of allied health professionals. We learned more about each other’s roles in each hospital. I think the general population now sees hospitals differently."

Sylvie, serving patients and caregivers

Stéphane Guillon, IT support manager for the Research Center and Head Office

"As soon as the first lockdown was announced, our priority was to set up remote work. We had to quickly organize secure remote access for all appropriate personnel in the Hospital Group. This allowed us to keep the crisis management team operational so that patient treatment, team meetings and multidisciplinary team meetings could continue. Remote access also allowed us to expand the use of telehealth appointments. All the hardware and software was supplied, and users were given technical assistance and training to help them navigate these changes. We organized ourselves into task forces. There was a great sense of team spirit."

Mohamed Fall, IT support manager for the Hospital Group

"The President of the French Republic invited me to take part in the 2020 Bastille Day parade and I received the Medal of National Order of Merit. It was a great honor for Institut Curie and its staff. I was there to represent all our caregivers. It was important to them."

Stéphane & Mohamed, ensuring continuity of services using digital technology

"In March 2020, we quickly had to switch from face-to-face to remote work. That even included us in IT support! We used Microsoft Teams, reorganized workstations, and gave laptops to our colleagues so that they could access Institut Curie’s network. We dealt with every query, no matter the issue, including the many connection problems at the beginning. The entire team was involved! There was great solidarity between the departments and we got to know all our colleagues in the institute a little better. The pandemic brought us together."

Franck, the research must go on

"We were ready to be locked down, to have to close the Research Center, or to transform how we work so that we could do it remotely. I may be a biologist, but when the pandemic started, my first priority became logistics. We had to close the labs, get teams to stop their work, and halt research projects. But we still managed to do our best to complete vital experiments to preserve our most valuable experimental models and organize weekly remote meetings. And then, slowly, we got back to work in the labs. My second priority was to manage the impact of the crisis on our staff, particularly its psychological repercussions. So, I had to become a manager too. And I learned that it is not easy to manage teams remotely.

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We got so little negative feedback, even though people were suffering. It was a real joy to witness that solidarity, that unity, within the groups and between the teams."

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Agility and efficiency: keeping the institute on track despite the pandemic

The COVID-19 pandemic significantly impacted treatment, finances, and logistics at the institute. Those obstacles had to be tackled by the institute collectively if it was to stay operational. Here Prof. Thierry Philip and Daniel Thierry, respectively chairmen of the Executive and Supervisory Boards, share their thoughts on the past year.

"Two things were driven home to me by the pandemic. The first is our organization’s extraordinary ability to adapt. Even after 100 years, the institute remains dynamic. The second was everyone’s dedication, without which it would have been simply impossible to continue. The Institut Curie spirit is very much alive in the Research Center and Hospital Group, and at Head Office."

How did Institut Curie handle this unprecedented emergency?
Prof. Thierry Philip: It was in large part thanks to the effective combined efforts of the directors of the three entities and their teams. Each one of us has been in constant communication with the others. Once digital solutions were in place, we were quickly able to switch from face-to-face communication to videoconferencing. That said, the hospital was heavily impacted. During the first wave, we had to accommodate COVID-positive patients and so had less room for cancer patients. Windows of opportunity were lost for those patients and their futures. By preventing further disruption to our core activity during the second wave, the Regional Health Agency put us in a better position to care for our patients. On a general note, I wish to thank all staff in the three entities for their dedication, adaptability, and unwavering commitment, as these kept the institute up and running. We handled this unprecedented situation by working together.

Were you worried about the finances of the institute?
Daniel Thierry: 2020 was a year of financial uncertainty. At times, we were waiting to see whether or not the government would help us and our generous donors would continue to support the fight against cancer. But the government stepped in in the most remarkable manner. We practically had the same budget as any normal year.

"This period caused great upheaval in the way we work. That upheaval will no doubt continue, but we now know that the ties between the entities are strong enough to withstand it."

Daniel Thierry

The same for donations – we received the same support as we did in previous years. All we can do is thank our donors for their generosity. Given the circumstances, they had to dig even deeper.

What role did the recently established governing boards of Institut Curie play in managing this crisis?
Prof. Thierry Philip: In the two years since the new articles of incorporation came into effect, collaboration between the Executive Board and Supervisory Board has gone from strength to strength. The 2020 pandemic expedited a process that was already underway. It strengthened the ties between us. We managed to find our own rhythm at the height of the pandemic, meeting to discuss things informally on a very regular basis. Everyone contributed as befitted their role. COVID helped us find our feet.

Daniel Thierry: Looking back, our governance has strengthened the ties between us. We managed to find our own rhythm at the height of the pandemic, meeting to discuss things informally on a very regular basis. Everyone contributed as befitted their role. COVID helped us find our feet.

How did you manage to ensure teaching was not disrupted during 2020?
Prof. Thierry Philip: We had to adapt by setting up webinars and videoconferences. It was a difficult time for medical interns, who were pressed into service throughout the pandemic. Scientific projects came to a sudden halt at the Research Center. PhD students were unable to complete their work. Luckily, the government allowed us to extend their contracts so that they could finish their research in time, and the foundation agreed to assist them over a longer period. And that’s what matters.

Were you able to continue the institute’s construction projects?
Prof. Thierry Philip: Yes, thanks to everyone’s hard work we managed to make progress on that front as well. The construction projects were delayed during the first lockdown, although we did manage to make headway on our projects in Paris. We now have a budget of €190 million for all our real estate projects.

Daniel Thierry: We invest a considerable amount of capital as a stakeholder in the healthcare industry, not on only a national level but a European level as well. A hundred years after being founded, Institut Curie remains as active as ever, and through its investments it continues to develop its blueprint for excellence and innovation.

The Ethics Committee of the Supervisory Board was set up in 2020. What is its role?
Prof. Thierry Philip: The Ethics Committee was set up on March 25, 2020. It is chaired by Marc Joliot, the great-grandson of Pierre and Marie Curie. Marc is also a member of the Supervisory Board, on which he represents the descendants of the Curie family. The Ethics Committee is vital to the work of the Supervisory Board and the institute as a whole. It has no direct operational role, but instead supervises the three existing ethics bodies: the Medical Ethics Commission for the care of patients and relatives, the Ethics Committee on Animal Experimentation, and the brand-new Institutional Ethics Commission.

Prof. Thierry Philip: The Ethics Committee examines the ethical issues that sometimes come with advances in science and medicine. On a side note, the Medical Ethics Commission for the care of patients and relatives met practically every week during the lockdowns.
Cohesion and responsiveness: two of Institut Curie’s key strengths

Whether to protect their staff and patients, reevaluate their needs, or make sure that they could continue their work, the Hospital Group, Research Center, and Head Office worked as one during the pandemic. Here the directors of the three entities look back on this strange year.

Prof. Pierre Fumoleau, director of the Hospital Group: Right from the beginning of the health emergency, we made sure that everyone at the hospital was wearing masks so that we could manage cancer patients with and without COVID and protect our medical staff. The Regional Health Agency also called on us for help. They needed to relieve pressure on the health system, so they asked us to take non-cancer COVID-positive patients. Although all patients already being treated at the Institute continued to receive their treatment during the pandemic, we observed a 30% drop in new patients as primary screening and early-diagnosis centers became affected. In light of that situation, from September to the end of 2020, systems were put in place to prevent any subsequent disruption to our cancer care.

Jacques Gilain, director of Head Office: The pandemic strengthened collaboration between the three entities. Our working relationship was based on clear, coherent decision-making. At Head Office, senior management worked on defining and implementing our continuity plan. They also actively contributed to those of the Hospital Group and Research Center, thanks in particular to the development of collaborative software solutions. We experimented with working remotely and forgoing staff. It should be noted that at all times we engaged in constructive dialog with staff and staff representatives.

Did you manage to make progress in your work despite the pandemic?

Prof. P. F.: We added Halcyon machines to our array of radiotherapy equipment. We set up partnerships with the health care cooperation groups, the Institut Mutualiste Montsouris and the Cancer Center of Reims, an arrangement which allows our staff to work in their hospitals and treat their patients. We also secured staff to Saint-Denis General Hospital and Seine-Saint-Denis hospitals in the northern suburbs of Paris to combat inequality in access to care.

Prof. A. P.: Despite COVID, the new science program was launched at the Research Center, three joint research teams began their 5-year contracts at our Onsay location, and the Translational Imaging in Oncology team led by Irine Buvat was set up. Lastly, we signed a framework agreement with the Ministry of Higher Education, Research, and Innovation that is vital for supporting our work. And on top of all that, our researchers adapted to the restrictions and managed to complete their research.

J. G.: We continued our construction projects at Head Office. The extension of our Saint-Cloud location continued, as did work on the pharmacy at our Paris location, while there was also progress on the architectural extension work in our Paris Research Center. Not only that, but all the cross-departmental projects that are going into the Hospital Group and Research Center also went ahead.

Could you give us an example of one of the successes of 2020?

Prof. A. P.: The research. Our output was up nearly 17% in 2019. We published 566 papers, including 43 in some of the most prestigious international journals. There is no doubt that our researchers were more than a match for COVID-19.

Prof. P. F.: 2020 was also a good year for clinical research. For the first time ever, there were six hospital research projects funded under the PHRR/I regional program as well as a PRKT translational cancer research project, with these together representing a total of €1.8 million in MERRI funding. We received more funding this time because of the number of patients enrolled in clinical trials as well as the quality and volume of our publications.

J. G.: On a more general note, the pandemic proved once again that the Institute’s novel organizational model is not only fit for purpose but driven by strong principles that enable us to look to the future with confidence. We must also acknowledge the steadfastness and support of our donors throughout the health emergency.

As a director and on a more personal level, what was this unprecedented period like for you?

Prof. A. P.: I decided to close most of the labs on March 14, 2020, after the first COVID cases appeared among staff at the Research Center. I took that decision two days before the first lockdown was announced in France. It was a tough decision to make. But the immediate solidarity that all our teams displayed really struck me. I think of it as another reflection of the Institut Curie spirit.

Last question: how is 2021 shaping up?

Prof. P. F.: We need to continue managing COVID-19 with our patients, adapting our human resources, and investing in radiotherapy, surgery, and other areas.

Prof. A. P.: At the Research Center, we are channeling our efforts into getting the 2020–2025 science program up and running. The focus will be on interdisciplinary work. Besides raising the funds we need to keep our finances healthy, we will continue to implement our plans to provide the Hospital Group and Research Center with better service, support, and coordination so that they can continue to focus on their work.

Prof. Pierre Fumoleau
Researchers from the Chemical Biology of Cancer team led by Raphaël Rodriguez (CNRS UMR3666 / Inserm U1143) have discovered that cancer cells use a membrane glycoprotein, CD44, to internalize iron. By doing this, the cancer cells acquire metastatic properties. The iron-ingested fulfills two functions. It feeds the mitochondria, which then produce the metabolites necessary for a cell to become metastatic. And epigenetically, it locks certain genes that are also essential to metastasis. In this setting, CD44 is iron’s main point of entry into the cells. Having made this discovery, the research team now hopes that it can develop a therapeutic molecule that blocks cellular trafficking of iron and so eradicate cells with a high potential for metastasis. Iron gives cancer cell clones an advantage in resisting conventional therapy, but it may also be their Achilles heel. (Nature Chemistry, August 3, 2020)

566 That is the number of papers we published in high-impact journals in 2020, meaning that our output increased by 9% since 2019. To add a little context, the higher the impact factor, the better the quality of the journal and the papers it publishes. This metric is closely watched throughout the world of science, and it attests to the caliber of the research at the institute’s Research Center.

Building works
> Extending our facilities at Saint-Cloud to enhance our service to patients

The work started in October 2019 on the institute’s new hospital in Saint-Cloud combined throughout 2020. The objective is to streamline patient flow, improve hospital conditions for patients (particularly outpatients), and provide researchers with new research laboratories. Once the structural work was completed, a test patient room and lab were built to assess user-friendliness and the quality of the finishing. Scheduled for completion in late 2022, the future building will have a surface area of 270,000 sq. ft and accommodate 148 patients. It will also be home to a clinical research center and 172,000 sq. ft of research facilities.

Fundraising
> Une Jonquille Contre le Cancer: our donors answer the call!

For the 16th year of the campaign, the institute’s national fundraising appeal for cancer research had a new look and a new name: Une Jonquille Contre le Cancer (A Daffodil Against Cancer). The campaign was held from March 10 to 22, 2020, to support the precision medicine programs being conducted at Institut Curie. Precision medicine will be crucial if we are to diagnose and treat cancer better and improve patient care. Even though the lockdown was announced and the campaign had to end early, the donors answered our call, with total donations running to €533,000! We wish to express our sincere thanks to all our generous donors.
Institut Curie

€401 M in resources
(€401 M) (excluding provisions and dedicated funds)

Total amount fundraised
€31.7 M
(Donations and patrons)

€22.9 M
(Requests and notarized donations)

218,000 donors

Leading

• European treatment center for breast cancer
• French cancer center by number of patients
• French cancer research center

Comprehensive Cancer center certified in 2018 by the OECI

698 patents

1,214 employees
of 64 nationalities

288 PhD students,
of whom 136 are international students (47%)

232 postdoctoral researchers,
of whom 154 are international researchers

98 collaborative R&D agreements
(+5% vs. 2019), representing a total of nearly €8 million (+6% vs. 2019)

4 start-ups
set up in 2020 and
27 set up since 2002, 95% of which are still in business after 5 years.

Research Center

6 areas of research

Epigenetics, RNA, and Genome Dynamics

Cell Biology and Developmental Dynamics

Radiobiology and Molecular Imaging

Physics of Living Systems and Chemical-Biology

Tumor Biology and Immunology

Computational Biology and Systems Biology

4 SiRIC-certified teams
(Integrated Cancer Research Site)

566 scientific publications:
146 papers published with an impact factor • 10 (+7% vs. 2019)
43 papers published with an impact factor • 20 (+17% vs. 2019)

13 research teams
jointly affiliated with the French National Center for Scientific Research (CNRS) and/or French National Institute of Health and Medical Research (Inserm) and/or a university

13 new programs
new flagship or emerging or PIC3i (Incentive and Collaborative Programs - Interdisciplinary, interdomain and/or interinstitutes) projects

86 research teams, including
19 junior teams

286 PhD students,
of whom 136 are international students (47%)

232 postdoctoral researchers,
of whom 154 are international researchers

98 collaborative R&D agreements
(+5% vs. 2019), representing a total of nearly €8 million (+6% vs. 2019)

4 start-ups
set up in 2020 and
27 set up since 2002, 95% of which are still in business after 5 years.

Donors

218,000 donors

Research agreements

€38.6 M
(Research agreements)

Technology platforms

18 technology platforms

Key figures

3,713 employees

547 PhD students, master’s students, residents, nursing students and hospital students in training
107,523 consultations, including 4,601 genetic consultations

166,414 hospitalizations including:
- 155,297 outpatient hospitalizations (55,771 of which for day-care)
- 11,117 inpatient hospitalizations
- 5 days is the mean length of hospitalization

46,643 chemotherapy treatments dispensed

12,829 hospitalizations for surgical procedures, including 7,251 outpatient hospitalizations for surgical procedures

99,526 radiotherapy sessions

14,215 surgical procedures

1,761 patients enrolled in a clinical study out of 1,888 patients screened

222 clinical studies currently recruiting (including 179 in adults and 43 in children)

145 children enrolled in clinical studies out of 149 screened
Shaping the future together

“I have been part of Institut Curie’s Scientific Advisory Board since 2007. The more I have learned about Curie the more I admire it. The emphasis on young independent groups and turnover supports a very broad range of fundamental research (biomedicine, chemistry, physics, computation) and attracts world-class junior researchers to Paris. Institut Curie also produces top-quality translational research that is often carried out by younger clinician-researchers who somehow balance patient care, leading a research team and finding time for personal life. While, on every visit, my brain delights in the new discoveries and technologies coming from the Research Center, my greatest admiration is for the clinician scientists and clinicians who use fundamental discoveries to improve the care of patients.”

Prof. Iain Mattaj,
Chairman of the Scientific Advisory Board at Institut Curie
Director of Human Technopole – Milan (Italy)
To multiply or adapt to constraints in their microenvironment, cells can sense certain physical parameters. Two of the Institute’s teams have been studying these physical and biological mechanisms. The Polarity, Division and Morphogenesis team led by Yohanns Bellaïche (CNRS UMR3215 / Inserm U934 / Sorbonne University) has discovered that in response to morphogenetic forces, cells possess the ability to know what size they are and adapt their shape and proliferation rate. Meanwhile, over at the Systems Biology of Cell Polarity and Cell Division team led by Matthieu Piel (CNRS UMR144 / Sorbonne University), they have uncovered how certain immune and cancer cells adapt their behavior when spatially constrained in dense tissues. (Science 2020, Lopez-Gay et al., Science 2020, Lomakin et al.)
Membrane trafficking
> Deciphering vesicle formation at the membrane
ESCRT are protein complexes located on cellular membranes. They aid in detaching vesicles into cellular compartments or secreting viruses such as HIV from the cell. The Membranes and Cellular Functions team led by Patricia Bassereau (CNRS UMR168 / Sorbonne University) has observed the formation of some of these ESCRTs as well as their possible role in membrane deformation. Their research presages the development of a drug candidate with a wide spectrum of applications. (Nature Chemical Biology, Ludger Johannes et al.)

Genome
> The role of R-loops in genome instability and precancerous lesions
As a cell is forming, the processes of DNA transcription and replication can sometimes collide. Such collisions result in aberrant replications in the cell and these defects can lead to cancer. Hybrid DNA:RNA structures known as R-loops play a role in this process, and the effect they have can be positive or negative. The Replication Program and Genome Instability team led by Chunlong Chen (CNRS UMR3244 / Sorbonne University) has demonstrated that these head-on collisions between transcription and replication can be avoided using fork pausing at the terminators of highly expressed R-loop-containing genes. (Nature Communications 2020, Promonet A. et al.)

Infectious diseases
> A single drug against several viruses
For several years, the Endocytic Trafficking and Intracellular Delivery team led by Ludger Johannes (CNRS UMR3666 / Inserm U1143) has been working with researchers from the French Alternative Energies and Atomic Energy Commission (CEA) on developing a new type of treatment that does not attack pathogenic agents directly, but instead prevents their intracellular transport. They have synthesized compounds called Retro-2 that prevent the harmful effects of many pathogens (patented CEA/Institut Curie). In 2020, they decrypted the mechanism of action of one molecule of the Retro-2 family that might neutralize the harmful effect of a large number of pathogenic agents, including Ebola virus, enterohemorrhagic Escherichia coli, and cholera toxin. Their research presages the development of a drug candidate with a wide spectrum of applications. (Nature Chemical Biology, Ludger Johannes et al.)

Four innovations set to make a difference
Making researchers’ lives easier with a smart microscope
Could artificial intelligence (AI) be incorporated into a microscope to help researchers observe biological phenomena? That is the aim of the project led by Yohanns Bellaïche, Deputy Director of the Genetics and Developmental Biology unit (CNRS UMR3215 / Inserm U934 / Sorbonne University) and team leader of the Polarity, Division and Morphogenesis team. It could be done by teaching AI to read microscopy images and recognize when a biological process was about to happen, like mitosis (cellular division) or apoptosis (cell death). The AI would then adjust image acquisition parameters either by zooming in or taking a series of images closer together.

For now, the researchers have to spend hours on end with their eyes glued to their microscopes or program the microscopes to take thousands of images of samples which must then be analyzed. This new tool, christened O-NEAT for Online (and offline) Networks for Event Aware Topological Detection, will save researchers time and augment their observation of these mechanisms. The project has been awarded an 18-month ERC Proof of concept grant of €150,000 to finalize the project and make it as widely deployable as possible.

The opinion of...
Prof. Edith Heard,
Director General of the EMBL, Heidelberg (Germany)
Professor at the Collège de France
“In order to improve our knowledge and eventually propose new therapies to cancer patients, it is essential to develop our analysis and observation tools. Yohanns Bellaïche’s O-NEAT project is a very promising innovation in imaging. It can be applied to any biological process under study. By reducing the number of images taken, by optimizing the precision and quality of the images obtained, it represents a way to considerable save time and energy for researchers. Once developed, this new generation microscope should attract the interest of the scientific community and many industrialists.”
Advances in cancer research have led to the development of simpler, more relevant tools to evaluate the efficacy of drugs in oncology, whether for the study of new treatments or to assess the possible interactions between drugs and the patient. Through the COMMiT project, Jean-Louis Viovy’s team is moving in this direction with a very innovative approach of 3D tumoroid models. If the applicability and industrialization are confirmed, they will become indispensable tools in cancer research, whether for the study of new treatments or to assess the possible interactions between drugs and the patient. Through the COMMiT project, Jean-Louis Viovy’s team is moving in this direction with a very innovative approach of 3D tumoroid models. If the applicability and industrialization are confirmed, they will become indispensable tools in cancer research, whether for the study of new treatments or to assess the possible interactions between drugs and the patient.

Developing “tissues” for the oncology of the future

The COMMiT project (Cancer Organoids Multiscreened in Microfluidic Textile Chips) is the brainchild of Jean-Louis Viovy, an emeritus researcher at the Institute’s Physical Chemistry Laboratory (CNRS UMR168 / Sorbonne University). The project has the potential to greatly accelerate oncological research and improve choice of treatment. The idea is to simultaneously test several drug combinations on tumoroids, three-dimensional models constructed from cultured tumor cells. Until now, such testing was only possible in two-dimensional cells or in vivo models. The problem is that two-dimensional cells yield unreliable results, while in vivo models are time-consuming, costly, and, ethically speaking, deserving of alternatives. Dr. Olivier Delattre, Director of the Cancer, Heterogeneity, Instability, and Plasticity unit (Inserm U830), is developing just such an organoid screening technique at Institut Curie. Together with Jean-Louis Viovy, they hit on the idea of transposing the organoids into the world of microfluidics, thereby considerably miniaturizing them and obtaining results in a few days instead of several months. To do this, Jean-Louis Viovy turned to the ENSAT (arts and advanced textiles school in Roubaix, France), to use textile technology to develop innovative, low-cost microfluidic systems that could eventually be applied to precision medicine. The project has been awarded an ERC Proof of concept grant of €150,000 to prove that the method is effective for testing treatments and feasible on an industrial scale. This testing will involve measuring the development, stagnation, or regression of tumoroids depending on the treatment used. 

Four innovations set to make a difference

Developing “tissues” for the oncology of the future

The opinion of...
Prof. Christophe Le Tourneau,
Head of department of Drug Development and Innovation (D3i)

“The medical community clearly needs simpler and more relevant tools to evaluate the efficacy of drugs in oncology, whether for the study of new treatments or to assess which treatment would be the most suitable for a given patient. Through the COMMiT project, Jean-Louis Viovy’s team is moving in this direction with a very innovative approach of 3D tumoroid models. If the applicability and industrialization are confirmed, they will become indispensable tools in cancer research, whether fundamental, translational or clinical.”

Understanding the mechanisms behind Flash radiotherapy

The opinion of...
Prof. Gilles Créhange,
Head of the department of Radiation Oncology at Institut Curie

“When radiotherapy was discovered, the radiation was delivered over a wide field and entered healthy neighboring tissue. To prevent toxicity but still destroy the tumor, the radiation dose had to be fractionated and spaced out. However, advances since then in imaging and medical physics have made it possible to adapt the dose to the type and metabolism of each tumor and ensure better control of the field irradiated. Now Flash radiotherapy is opening up new possibilities. A single high dose of radiation can be delivered in one session that achieves the same tumor response but with fewer side effects. Contrast this with the 20 to 40 sessions that used to be necessary. This is very promising for patients.”
Four innovations set to make a difference

**Enabling precision medicine through AI**

The European project PerMedCoE (Center of Excellence in Personalised Medicine) aims to harness the power of supercomputers to boost diagnostic software by incorporating precision medicine into a new European high-performance/exascale computing system. It will do this by 1) optimizing four mathematical applications to translate data from genomics, transcriptomics, proteomics, and metabolomics into actionable medical solutions that benefit patients; and 2) by developing simulations of real-life use cases of precision medicine. These simulations will focus on cancer diagnosis, drug interactions in certain forms of cancer, cancer prediction and progression, and individual patient modeling in rare diseases. The project has received nearly €5 million in funding over 3 years as part of the Horizon 2020 Research Infrastructures program, including €441,000 for the Bioinformatics and Computational Systems Biology of Cancer team led by Emmanuel Barillot (Inserm U900 / Mines ParisTech). The team is lendng its expert knowledge to the analysis of molecular tumor data obtained via high-performance computing. The scientists are also helping with the mathematical modeling and simulation of tumor progression.

**Medical-scientific programs**

**Breast cancer** – Coordinators Prof. François-Clement Bilard & Fatima Mechita-Gilgiliarou
- Change in governance with the arrival of Prof. Bilard and new monthly interdisciplinary meetings
- 20 publications with an impact factor of more than 10
- €200,000 in public donations to be used as funding for three innovative translational projects: PREVIO (Colée Vallot), PAR (Ilene Buvat and VIS BRC/Gustave-Henri Steri) and MUSC (Limoges U458)
- Funding secured to launch three clinical trials: TOP-IC (High-throughput Prof. Bilard and L. Cab; Colée Vallot), MORDIAN (Prof. François-Clement Bilard) and NCD TNC (Dr. Elinor Blake)

**Adult sarcoma and desmoid tumour**

Dr. Sylvie Bonvallet & Josh Waterfall
- €250,000 in funding secured to invest in the research project "Targeting iron homeostasis in desmoid tumors." This project is led by Dr. Sarah Watson and is being conducted in collaboration with Raphael Rodrigues's research team
- Partnership agreement with Centre l'on Bilard to develop sarcoma organoids

**Radiotherapy and radiation biology**

Prof. Gilles Collette & Maria Daulet
- Integration of Translational Imaging in Oncology, a new joint research unit led by Ilene Buvat (Inserm U1288)
- Electron-Flash 4,000 accelerator installed and qualified at our Cour anr Location in August 2020
- Sponsored research agreements with SFR, Varian, EDF, and Thales
- Further national and European funding secured (IPSC, Horizon 2020)
- €200,000 in public donations invested in two collaborative, interdisciplinary projects: the PICCII joint research project with the CEA led by Pierre Venet, and the RadRenaM/Act collaborative project jointly led by Yolanda Pezzola and Sabine Ameloun
- More than €500,000 raised through the SERISE and IFMO calls for proposals. Funds to go toward the purchase of a microPET scanner (Ilene Buvat)
- 30 high-impact publications in 2020
- Success of the flash radiobiology workshop in September 2020

**Epigenetics**

Prof. Geneviève Almouzni & Celine Vallot
- Continuation of EpIFoRM seminar on various topics, including ATAC-seq and spatial兒ics
- Cure Innova Booster funding for continued development of the CENTERA project led by Jean Pierre Quivy, Pierre Venet, and Didier Mezierer
- Research project set up to investigate mesenchymal tumors with the backing of a CCE grant. Project led by Dr. Sylvie Heslot, an endocrinologist at Institut Curie.
- Collaborative project set up between Fabrice André at the Gustave Roussy cancer center and Prof. Christophe Le Tourneau.
- Prof. François-Clement Bilard, and Geneviève Almouzni at Institut Curie. The project aims to identify epigenetic biomarkers predictive of breast cancer recurrence

**Uveal melanoma**

Prof. Nathalie Caux & Sébastien Sagan
- Launch of the EarlyTogether and SALOMÉ clinical trials conducted by Dr. Sophie Piperno-Neumann
- Funding secured for two projects through a French National Cancer Institute (INCa) PRM call for proposals in translational cancer research: Treat-MBD4 (led by Marc-Henri Stern) and RadRet (jointly led by Dr. Alexandre Matet)
- A project led by Samir Alakdi and Sergiy Roman-Roman launched after securing €100,000 in funding through the Sarcom award program
- Backing secured for the PLUME clinical trial conducted by Manouk Rodriguez through a PHRC call for proposals for hospital research in oncology by the French National Cancer Institute.

**Urology cancer**

Prof. Yves Allely & François Raduvar
- Publication of “A Consensus Molecular Classification of Muscle-Invasive Bladder Cancer” (EurUrol. DOI: 10.1016/j.eururo.2019.09.006)
- Success of an international collaboration led by Institut Curie and Vallée d’Acis in Cancer that has provided a global consensus-based classification for studying treatment resistance and new therapeutic targets
- PRTK BOBCAT study of readout-sensitive chemotherapy response in muscle-invasive bladder cancer based on molecular subtypes. Study conducted in more than 300 cases, with pre- and post-treatment biopsy sampling and RT final results in 2021
- Partnership with Urospin/Unelco for a molecular and pharmacological study of PDV models of molecular subtypes

**Immunotherapy**

Prof. Sébastien Angelaous & Dr. Emanuela Romano
- More than 15 funding grants secured through calls for proposals for translational research or collaborations with industry for a total amount of more than €4.5 million
- Launch of a new collaborative project called RadivimmACT on the back of €150,000 in public donations. The project is jointly led by Yolanda Pazzola and Sebastian Angelaous
- Launch of Effi Therapeutics, our fourth immunotherapy start-up, by Ilene Buvat
- 60 publications in in immunology, more than half of which have an impact factor of more than 10
- Renewal of Gustave Roussy-Institut Curie joint research project into Nanolysis led by Prof. Laurence Zviboco and Dr. Olivier Lantz

**Thoracic cancer**

Prof. Nicolas Girard & Dr. Olivier Lantz
- Launch of several projects into predicting chemotherapy response for lung cancer: TIPIT (backed by the ARC foundation), ARIACure (Spanish Lung Liberty project (PRK INCA D05 grant for translational research in oncology). Launch of a project into response to targeted therapies: PRECISION (BACK by Health Data Hub)
- Launch of the REAL MOOV lung trial in collaboration with MOCORE Thymic malignancies

**Pediatric and adolescent cancer**

Prof. Olivier Delattre & Prof. François Doz
- Development of research projects into Immunotherapy for pediatric cancer (Ewing sarcoma and Rhabdoid tumors). More than €2 million in academic funding secured
- Collaboration with Oneway to develop a therapeutic molecule for high-grade glioma
- Further development of SREDO'S European and international presence with roughly 10 academic collaborations signed and three European grants secured
- Expansion of Franc's Pediatric Medicine Plan 2025 to two pediatric indications (leukemia and diagnosis)
- More than 20 publications in high-impact journals

**Early phase trials**

Dr. Christophe Le Tourneau & Prof. Christophe Girard
- Molecular multidisciplinary team meeting at Institut Curie to mark the inclusion of the first cancer patient in the Phiris Pediatric Medicine Plan at the SeqOIA genomic medicine laboratory
- Enrollment of the first patients in the PEVIdat European clinical trial coordinated by Prof. Christophe Le Tourneau
- Launch of SuperTHRAT and Onch3g projects (94 publications on high-impact journals)
- 72 early phase clinical trials in 2020

**The opinion of…**

José Fernandez, Chief data officer

“DNA may be the best known molecule in the world. Its double-helix structure was discovered by Watson and Crick, and even back then, it was clear that our understanding of it was not just on theory, but on data. First the atom, then the gene, and now the bit is becoming the third great pillar of our existence. We must harness this digital revolution to treat cancer.”

> WITH Emmanuel Barillot

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SHAPING THE FUTURE TOGETHER
Finding ways to continue teaching

Since the institute was founded, one of its missions has been to train researchers and doctors from France and abroad. Although our training programs were disrupted by the 2020 pandemic, the institute still managed to continue its training courses.

Be it for MA, PhD, medical and nursing students, or postdoctoral researchers or medical interns, Institut Curie is renowned as a center of learning. And in 2019 that renown grew even further with an expanded range of courses. However, that was before the 2020 pandemic put everything on hold despite the best efforts of the Training unit headed by Graça Raposo from the Research Center and Prof. François Daz from the Hospital Group.

2020 saw the first PhD students enter the EuReCa PhD program

The closure of the Research Center had a major impact on PhD students and postdoctoral researchers. Fortunately, the Training unit soon came up with solutions. They used videoconferencing to set up virtual classes to continue core subjects like soft skills as well as others that count toward university and inter-university degrees. They also began recruiting PhD students online. For example, online selection was used for the EuReCa (Europe Research & Care) PhD program launched in December 2019 and co-funded by the European Commission. This program seeks to foster an international, interdisciplinary, cross-sectoral approach to research and is set to lead to the recruitment of 39 PhD students in the next 3 years. Despite the circumstances, EuReCa’s first year was a great success. Some 369 candidates applied, and 32 were selected. After virtual interviews in May 2020, eight candidates were chosen and joined the institute the following October. The institute is the only center in Europe to be awarded two grants under this extremely competitive program of excellence. Most of the PhD theses in the program focus on translational research.

A major impact on international students

Our international programs for MA, PhD, medical students and postdoctoral researchers were also affected. The pandemic forced Institut Curie to cancel its courses from March to May 2020. However, some courses then switched to virtual learning.

Bioinformatics became the first of our courses to be delivered fully online.

Our international medical and student internships in the Hospital Group were also disrupted by the pandemic and restrictions on international travel. Despite the difficulties, Institut Curie did manage to process 110 internship applications from students and doctors in 32 countries. However, even though 55 applications were accepted, only 36 internships went ahead in 2020 with the other 19 scheduled for 2021. COVID-19 also forced the postponement of an agreement signed in 2019 with the service provider Invivox to provide French and international doctors with the opportunity to learn techniques from the institute’s specialists. Nevertheless, the Invivox platform proved invaluable in enabling the institute to run free courses for numerous attendees with Prof. Fabrice Lecuru, a surgeon and Head of the Gynecology unit at our Paris location.

“The Training unit was very active during the first lockdown. We set up virtual classes as well as meetings between PhD students and postdoctoral researchers. The thesis advisors and postdoctoral researchers also worked hard to find ways of doing lab work online.”

Graça Raposo, Director of Advanced Training for the Research Center and Head of Structure and Membrane Compartments team
Making a difference together every day

"The first thing that struck me when I began treatment at Institut Curie was the welcome I received, how kind everyone was. Everyone, from the secretaries, administrative staff, nurses, and oncologists to the patient transporters, nursing assistants, and surgeons, taking the time to explain, answer your questions, and reassure you, despite how busy they are. That's not always the case. I saw what it was like for a family member who was treated in another hospital. Yet communicating and passing on information are really important. They're essential to us as patients. They contribute to building trust as much as any other aspect of care. For example, I know I can send an email to my oncologist’s secretary and that I’ll get a reply in no time at all. I know I’ll be looked after. The staff at Institut Curie don’t just see you as a case – they see you as a person."

Pascale, 48 years old, treated at Institut Curie for breast cancer.
COVID-19 and cancer: Institut Curie at the cutting edge of research into the virus

The institute and its teams have been in the fight against COVID-19 since the beginning, conducting several novel studies into the possible effects of coronavirus on cancer patients.

Right back in March 2020, we began reorganizing our operations to ensure patients continued to receive their treatment. We also began assessing the risk posed by coronavirus to our patients and personnel.

Tracking excess risk and mortality
A study was conducted in March 2020 by Dr. Paul Cottu, Deputy Head of the Medical Oncology Department at Institut Curie. It enrolled 15,000 breast cancer patients who were being treated at our Paris and Saint-Cloud hospitals.

Of all women receiving active treatment, only 59 had confirmed COVID-19. The fact that patients were receiving chemotherapy or other treatments seemed to have no impact on disease severity, although the type of cancer they had did (e.g. lung cancer vs. hematological malignancy). Additionally, radiotherapy to the breast or neighboring lymph nodes had no impact on COVID-19 severity.

Between mid-March and mid-May, 2020, the institute also set up a register of all patients with confirmed or suspected COVID-19 infection to monitor them in real-time. In total, it included nearly 200 inpatients and outpatients, each of whom was then actively followed up for 28 days. The incidence of COVID-19 among those patients was 1.4% – practically the same as that in the general population. More than 1,800 participants in the study. It was discovered that 11% of the sera analyzed contained antibodies and that 21% of COVID-positive participants were asymptomatic. Additionally, 5% of infected participants had no IgG antibodies. These results suggest that the prevalence of infection may be underestimated. The study has been extended for one year to continue tracking seroprevalence.

Ensuring continued patient care
The pandemic and lockdowns forced teams at the institute to switch to telehealth appointments via video-conferencing software to ensure the continued care of patients. However, patients are given a choice between video and telephone appointments in case they do not have access to video.

“In July 2021, the ONCOVID-19 study, conducted by the Union Bicôlôur Center, based on data collected by 18 cancer centers, showed that cancer patients affected by COVID-19 had a higher and earlier risk of mortality.”

“Istitut Curie has shown exemplary responsiveness in its efforts to fight against COVID-19. From caregivers and research teams to administrative and technical staff, everyone knew how to rally together. After the very beginning of the pandemic, which led to delays in diagnosis and treatment for our patients, the institute was able to adapt to continue its mission – to fight cancer.”

Prof. Djillali Annane, member of the Executive Board of Institut Curie and Dean of the Simone Veil Faculty at the University of Versailles Saint-Quentin-en-Yvelines

The data from our study is invaluable for managing patients, since two-thirds of them are scheduled to undergo certain procedures and treatments that cannot be done remotely.”
Dr. Paul Cottu, Deputy Head of the Medical Oncology department

A study of COVID-19 seroprevalence
During that same period, the institute also investigated the impact of coronavirus on its staff. To do this, it joined forces with Institut Pasteur to conduct a serological study called Curie-O-SA in all its hospital and non-hospital staff.

The study was coordinated by the clinical immunologist Dr. Olivier Lantz. It aimed to monitor the spread of SARS-CoV-2 and gather information about seroprevalence in the working population in and around Paris. In that study, seroprevalence was taken to mean the proportion of people harboring COVID-19 antibodies in a given population.

Of all women receiving active treatment, only 59 had confirmed COVID-19. The fact that patients were receiving chemotherapy or other treatments seemed to have no impact on disease severity, although the type of cancer they had did (e.g. lung cancer vs. hematological malignancy). Additionally, radiotherapy to the breast or neighboring lymph nodes had no impact on COVID-19 severity. Between mid-March and mid-May, 2020, the institute also set up a register of all patients with confirmed or suspected COVID-19 infection to monitor them in real-time. In total, it included nearly 200 inpatients and outpatients, each of whom was then actively followed up for 28 days. The incidence of COVID-19 among those patients was 1.4% – practically the same as that in the general population. More than 1,800 participants in the study. It was discovered that 11% of the sera analyzed contained antibodies and that 21% of COVID-positive participants were asymptomatic. Additionally, 5% of infected participants had no IgG antibodies. These results suggest that the prevalence of infection may be underestimated. The study has been extended for one year to continue tracking seroprevalence.

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Breast cancer

Delving deep into the mechanisms behind breast cancer

Here we take a look back at four breast cancer studies conducted by the institute in 2020. Not only do these studies mean advances for patients and health professionals alike, but they also provide new insights into the mechanisms behind breast cancer and ways of improving patient care.

A promising new treatment
Some women develop resistance to hormone therapy. This means that their cancer can become metastatic. Elisabetta Marangoni, a researcher in the Preclinical Investigation Lab of the Institute’s Translational Research Department, has been studying these tumors, and she and her team are the first in the world to develop preclinical models of bone metastases from them. Their research made it possible to test a PLK1 inhibitor on these tumors that made them regress and even disappear.

A clinical trial into this promising therapy is set to be launched in the institute’s hospitals.

Youth as a favorable prognostic factor
Being younger may mean longer survival for patients with advanced breast cancer. This is the finding of a study conducted by Dr. Sophie Frank, a gynecologist at Institut Curie and breast cancer specialist.

Dr. Frank worked on this study with the help of Dr. Paul Cottu, Deputy Head of the Medical Oncology department. They analyzed the records of 14,403 women with metastatic breast cancer and found that though advanced cases were more common in those under 40, mortality was no higher.

The role of certain lymphocytes in the lymph nodes
In the lymph nodes where lymph is collected, various immune cells are responsible for eliminating pathogens, damaged cells, and cancer cells. In breast cancer, it is the axillary lymph nodes that are affected first. The Translational Immunotherapy team (Inserm U932) led by Eliane Piaggio and her team found that though axillary lymph nodes were more common in those under 40, mortality was no higher.

Choosing the right treatment
A pilot study was conducted by Prof. Jean-Yves Pierga, Head of the Medical Oncology Department, and Prof. François-Clement Bidard, oncologist at Institut Curie. Their study was published in JAMA Oncology and showed the utility of measuring circulating tumor cells when deciding which treatment to use against metastatic hormone-sensitive breast cancer. Why? Because the greater the number of circulating tumor cells, the more the tumor tends to spread quickly and resist treatment.

Depending on whether the number of circulating tumor cells before treatment is high or low, the patient is prescribed either chemotherapy or hormone therapy. A quantifiable biomarker of this kind may therefore be a useful addition to the physician’s clinical judgment, and make patient management better.

"After participating in clinical trials, I now take oral chemotherapy once a day for 14 days, followed by 7 days off. We are taking it day by day. I am playing a game with time, trying to stretch it out with the drugs and well-being plan."

Gisèle, 47 years old, diagnosed with metastatic breast cancer

"Excerpt from the podcast "Curi(e)osité" by Institut Curie.

Focus

Octobre Rose 2020

October was breast cancer awareness month called Octobre Rose (Pink October), and to mark the occasion Institut Curie decided to focus on metastatic breast cancer, a disease that kills 12,000 women every year. Institut Curie is conducting a score of clinical trials to enhance our knowledge in this area. These trials are evaluating new molecules as well as combinations of existing therapies like chemotherapy, hormone therapy, immunotherapy, targeted therapy, and radiotherapy.

October was also the month we decided to communicate the results of our Viavoice Cancer Survey on the perceptions of French people regarding breast cancer. It was discovered that only 53% of French men (and 63% of French women) thought breast cancer could affect them or their loved ones.

To raise public awareness, Institut Curie set France a challenge: 12,000 Rubans Roses pour Curie “12,000 Pink Ribbons for Curie”. People had to make their own pink ribbons and share photos of their creations on social media.
**Emerging treatment strategies**

Institut Curie wants to improve survival rates among patients, and to do so is conducting clinical trials and presenting results at international oncology conferences. ADAURA is one such trial. It is being coordinated in France by Prof. Nicolas Girard, and is investigating the role of EGFR gene mutations associated with lung cancer. Of the 25% of patients whose cancer is amenable to surgery at diagnosis, around 10% harbor this mutation. Tyrosine kinase inhibitors block this phenomenon. If patients are treated with these inhibitors very early, the risk of relapse falls by more than 80%.

Another of the institute’s projects, Precision-Predict, aims to understand why targeted treatments succeed in some patients with EGFR-positive lung cancer but fail in others.

Predicting treatment response

But these are not the only cutting-edge research projects being conducted at the institute into the effects of drugs on lung cancer. In the Stress and Cancer team led by Fatima Mechta-Grigoriou (Inserm U830), Maria Carla Parrini is working with Prof. Gérard Zalcman to replicate a tumor microenvironment ex vivo in microscopic chips to test drugs against the entire cellular population of the tumor ecosystem. The goal is to fabricate a Tumor-on-a-Chip specific to each patient to predict response to treatments like immunotherapy, which are only effective in certain patients. Such a chip could also be used to study resistance mechanisms. This project is being funded with a 3-year grant from the ARC Foundation.

**A new hope for patients**

Lung cancer is the second most common form of cancer in men and the third in women. To improve survival rates – around 17% at 5 years* – Institut Curie is investigating new treatment strategies and conducting research into fine-tuning the prediction of patient response to treatment.

**Meeting the challenge of pediatric cancer**

Every year, Institut Curie treats more than 500 young patients for pediatric malignancies. Their diseases are rare and totally unlike those that affect adults. Through its specialized pediatric center SIREDO*, Institut Curie is supporting intense fundamental research.

**Improving our knowledge of Ewing sarcoma**

By combining AI and single-cell analysis, the Computational Systems Biology of Cancer team led by Emmanuel Barillot (Inserm U900 / Mines ParisTech) and Diversity and Plasticity of Childhood Tumors team led by Dr. Olivier Delatte (Inserm U830) have succeeded in identifying the mechanism behind recurrent Ewing sarcoma, a rare form of pediatric bone tumor. The researchers observed that the degree of activation of the EWSR1-FLI1 oncogene in each tumor cell influenced the cell’s behavior. If the oncogene was highly active, the cells proliferated and displayed mitochondrial energy metabolism, whereas if the oncogene was less active, the cell switched metabolism, and tended to migrate and metastasize. Their discovery is crucial to understanding relapse in this form of cancer. Yet it also means that though an inhibitor of this oncogene may stop cellular proliferation, the inhibitor would probably need to be combined with migration inhibitors to prevent metastasis from cells with low EWSR1-FLI1 activity.

* Source: INCa.
Center of excellence in eye cancer

As Instituts Curie is a core member of national eye cancer networks, it is dedicated to improving patient outcomes with better screening and treatments.

“...ocular cancer not only endangers the patient’s life, but also their eyesight and physical appearance.”

Prof. Nathalie Cassoux, Deputy Director of the Paris site and Head of the Surgical Oncology department and Ocular Oncology Unit at Institut Curie.

> A new genetic predisposition discovered in uveal melanoma

Uveal melanoma is the most common malignant tumor of the eye in adults. Until now, the only known genetic predisposition to this form of cancer was a hereditary mutation of BAP1, a tumor suppressor gene. But by analyzing more than 1,000 cases, the DNA Repair and Uveal Melanoma team headed by Marc-Henri Stern (Inserm U830) has now revealed that MBD4 also leads to a strong predisposition. “MBD4-positive tumors are hypermutated and may therefore respond well to immunotherapy. These findings confirm the need to screen every patient for these mutations,” says Marc-Henri Stern.

Number of patients treated by type of cancer or tumor at the Hospital Group of Institut Curie

- **7,020** breast cancer patients
- **689** eye cancer patients
- **685** patients with hematologic or bone malignancies
- **978** gynecological cancer patients
- **540** pediatric patients
- **819** gastrointestinal cancer patients
- **719** patients with cancer of the male reproductive system
- **396** sarcoma or mixed tumor patients
- **129** patients with cancers of the urinary tract
- **114** thyroid cancer patients
- **77** neurological cancer patients
- **370** skin cancer patients
- **7,020** breast cancer patients
- **1,070** patients for malignancies of the respiratory system
- **981** patients treated for benign tumors, including 59 children

Cancer can develop in the eye, just as it can in any other organ. Although rare, the most common forms of eye cancer are retinoblastoma in children, uveal melanoma (including choroidal melanoma), and intraocular lymphoma in adults. The institute has been a leader in this field for many years. It is the national referral center for retinoblastoma and national center of excellence of the Melanoma eye cancer network, which is certified by the French National Cancer Institute (INCa) and co-funded by that same institute and Malakoff Humanis. Institut Curie has also been the coordinator of the Melanoma network since 2013. Additionally, it is certified by the French National Cancer Institute as the national referral center for cerebral and ocular lymphoma. In that capacity, it is conducting a range of research projects to improve treatments like brachytherapy (radioactive iodine seeds) or proton therapy (precision radiotherapy) and help patients keep their eyesight. However, at the moment the goal is early screening for these forms of cancer to provide patients with rapid access to cutting-edge treatments. This research is being led by Prof. Nathalie Cassoux, head of the institute’s Ocular Oncology unit. Besides training ophthalmologists, she is also raising public awareness through events like World Cancer Day.
The patient at the heart of our missions

Continuation of the patient-partner project, e-health deployment for treatments and supportive care. Despite the difficulties due to the COVID-19 health crisis, Institut Curie is still fully dedicated to its patients – against all odds.

Remote continuity of care
Over the past several years, e-health assets have become a central feature of the healthcare system development, as well as of care pathways and their optimizations. Indeed, this is the precise reason why e-health is at the very core of the patient-partner project, which was launched in 2018, and is being piloted by Sylvie Amsoua, Director of Care of the Hospital Group of Institut Curie. The 2020 health crisis has further accelerated the development of digital electronic tools at the institution. Indeed, teleconsultations have been widely used for follow-up consultations with the oncologist, treatments provided at the day hospital (consultation prior to the oncologist, treatments provided at the day hospital), and e-health has similarly been implemented (réunion de concertation pluridisciplinaire, and radiotherapy follow-ups). Moreover, surveillance, postoperative consultations, hospitalization (anesthetic consultation, chemotherapy initiation and for follow-up), the day hospital (consultation prior to the oncologist, treatments provided at the day hospital), telemonitoring systems, teleconsultations, and e-health manager at Institut Curie.

> To respond even better to patients’ needs
The year 2020 provided the opportunity to launch new projects dedicated to cancer patients. Still in the frame of our patient-partner approach, quotes from patients were collected, which was primarily meant to gather their views and perceptions in regard to the pathways for managing breast and ear-nose-tumours cancers. This approach primarily sought to establish, with the help of healthcare professionals, a series of activities that were meant to improve the patients’ experiences during their stay at Institut Curie.

Dr Sandra Malak, hematologist and e-health manager at Institut Curie

Boosting further development in immunotherapy

Heralded as a major advancement in the fight against cancer, immunological research has become a central focus of Institut Curie. You will find an update on two promising studies published in 2020, in the following.

A combined treatment on the test bench
Prof. Christophe Le Tourneau, Head of department of Drug Development and Innovation (D3I), was the principal investigator of a clinical study conducted by the biotechnology company Transgene. The cohort comprised a heterogeneous group of patients, who had been previously treated and were suffering from different aggressive HPV16-positive cancer types, at advanced disease stages. The investigation was focused on the safety and efficacy of a treatment consisting of the combination of a therapeutic vaccine TG4001, targeting HPV16, and avelumab, a monoclonal antibody directed against programmed cell death ligand 1 (anti-PD-L1). Promising results were obtained, demonstrating the combination regimen of therapeutic vaccine TG4001 and avelumab to be associated with promising clinical antitumor activity in 34 patients who had previously been treated for recurrent or metastatic HPV-positive tumors.

Shedding light on the control of T lymphocytes
TCD4 lymphocytes are white blood cells that play an essential role in our immune system functions. Understanding the signaling pathways that govern cell differentiation and regulation is crucial to the discovery of new therapeutic drug targets. Sebastian Amigorena, Head of the Immune Responses to Cancer team (Inserm U932) and Director of the Cancer Immunotherapy Center at Institut Curie, identified an epigenetic approach primarily sought to establish, with the help of healthcare professionals, a series of activities that were meant to improve the patients’ experiences during their stay at Institut Curie. a monoclonal antibody directed against programmed cell death ligand 1 (anti-PD-L1) Promising results were obtained, demonstrating the combination regimen of therapeutic vaccine TG4001 and avelumab to be associated with promising clinical antitumor activity in 34 patients who had previously been treated for recurrent or metastatic HPV-positive tumors.

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Immunotherapy

To acquire these innovative skills while offering their services to the patients and their relatives. We are especially concerned with keeping in touch with our patients, while upholding the highest standards of safety and care for them,” concludes Dr. Sandra Malak, hematologist and e-health manager at Institut Curie.

Interdisciplinary Supportive Care (Disopo), which is currently headed by Dr. Carole Bouleuc. About 20 therapeutic educational workshops held as video conferences were proposed to in-hospital patients, as were tele-monitoring systems for patients hospitalized at home (HAAH), with daily teleconferences scheduled to occur with the HAAH staff members.

“The healthcare professionals have proven their utmost ability to adapt so as to acquire these innovative skills while offering their services to the patients and their relatives. We are especially concerned with keeping in touch with our patients, while upholding the highest standards of safety and care for them,” concludes Dr. Sandra Malak, hematologist and e-health manager at Institut Curie.

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T CD4 lymphocytes are white blood cells that play an essential role in our immune system functions. Understanding the signaling pathways that govern cell differentiation and regulation is crucial to the discovery of new therapeutic drug targets. Sebastian Amigorena, Head of the Immune Responses to Cancer team (Inserm U932) and Director of the Cancer Immunotherapy Center at Institut Curie, identified an epigenetic approach primarily sought to establish, with the help of healthcare professionals, a series of activities that were meant to improve the patients’ experiences during their stay at Institut Curie.

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All together, united against cancer

“Among the centers dedicated to the fight against cancer, Institut Curie has attained distinction as an international model of excellence. The institutional philosophy is instrumental as a fully integrated approach towards oncology that pursues three missions, including patient care, research, and teaching. After being at the origin of radiation therapy, Institut Curie has distinguished itself by its long-lasting experience with innovations. It now very actively participates in several major research projects, along with the World Health Organization (WHO) International Cancer Research Center, which are particularly focused on cancer genomics and pediatric cancers. In addition, the institute has become increasingly engaged in collaborations with industrials and international consortiums. With a strong original underlying model based on its foundation, which allies tradition and modernity, Institut Curie is continuously reinventing itself, contributing its best expertise for the benefits of its patients as well as the general public.”

Dr Elisabete Weiderpass, MD, MSc, PhD
Director of the International Agency for Research on Cancer (WHO)
Tech transfer

Incentive for the creation of start-ups.

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Indeed, the 2020 balance sheet turns out to be more than positive, notably with 60 inventions identified among Institut Curie's research teams, double the number in 2019.

At Institut Curie's crossroads of medical expertise and research

Last year, about a hundred research and development (R&D) partnerships were established and signed with various partners thanks to the advantages of the Carnot Label, which was granted to Institut Curie. This success perfectly illustrates the underlying trend, namely that the innovative and integrated concept of Institut Curie is a safe bet. For example, two contracts have been signed that are entirely based on artificial intelligence approaches that open the doors of research into Institut Curie's expertise fields. The first agreement was signed with the Israeli company Ibx Medical Analytics to improve breast cancer detection; the second was signed with Epigene Labs, aiming to discover new targets for ovarian cancer treatment. The agreement signed between GloCure SA and Institut Curie, which has benefited from the FINOMED consortium via the Carnot label, is primarily aimed at evaluating the efficacy of several drug candidates in the treatment of solid cancers, as based on preclinical models. Finally, the partnership between the company Clarins and Institut Curie has resulted in the publication of several studies covering the pigmentation of the human epidermis, which were published in Nature Communications.

Bringing out Institut Curie's excellence

As an essential player in oncological innovation and research, during the year 2020, Institut Curie continued conducting numerous projects on the identification of innovation potential and technology transfer.

The opinion of…

Luc Boblet, CEO Egle Therapeutics

"In oncology, immunotherapy is already producing very good results and Egle Therapeutics wants to go even further with a cutting-edge immunology project that could lead to a clinical trial within 2 or 3 years. Institut Curie has welcomed our approach by not only providing the means to our researcher Elie Piaggio to work in the best conditions, but also by promoting our research through patents. Driven by the same desire to innovate for the benefit of patients, we have developed a very balanced relationship of trust."

The opinion of…

Magali Richard, PhD, cofounder of Home Biosciences

"We are very proud of our partnership with Institut Curie and with Céline Vallot’s team enabling us to further develop our ‘discovery engine’ leveraging single-cell technologies. Over the next months, we will focus our efforts on establishing a team of talented data scientists, further developing our project portfolio, and implementing a multidisciplinary skilled group able to most effectively explore "omics" databases in an unprecedented manner."

Focus

Four start-ups in the spotlight

After 4 years of implementing Institut Curie’s strategy of supporting the development of young start-ups, 2020 was exceptional in many ways, resulting in the creation of several start-ups. All these successes are likely instrumental in speeding up the research process, improving the detection of cancers, or resulting in new innovative therapeutic approaches delivering benefits to patients.

In the field of immuno-oncology, Egle Therapeutics develops first-in-class immunotherapies targeting suppressor regulatory T cells (Treg) for oncology and autoimmune diseases (work of Elie Piaggio’s team). Since its very beginning, this company has entered a research alliance with the pharmaceutical company Takeda, specializing in oncology. Another new creation to be welcomed is Avatar Medical, a spin-off from Institut Curie, which was co-founded with Institut Pasteur. This start-up aims to create 3D patient avatars in order to support surgeons in preparing their surgical interventions in the context of immersive virtual reality (work of the late Maxime Dahari’s and Mohamed El Bensari’s teams). Meanwhile, this company has already been granted i-Lab label, in the setting of the 21st edition of the i-Lab national innovation competition, which aims to support business creation projects with strong technological components (work of Céline Vallot’s team). For its part, One Biosciences aims to become the leader in precision therapies for complex diseases, based on single-cell technology (see opposite page). The start-up IdiROS works on the development of functional therapies for the treatment of resistant or recurring cancers (work of Raphaël Rodriguez’s team). Moreover, the company was also winner of the I-Lab national competition, Homer Biosciences, which was created in 2018, specializes in cell-based therapies. This start-up was able to secure €2 million. These funds should accelerate the development of cell therapy technology.

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Curie’s spirit beyond borders

Besides its engagement abroad and its welcoming of foreign patients, Institut Curie actively participates in the progress of oncology worldwide, thanks to the knowledge and expertise of its physicians and researchers.

Each year, Institut Curie welcomes and treats many foreign patients (see box). In 2020, owing to the pandemic and travel restrictions around the world, only 280 patients benefited from treatments provided at its three hospital sites, compared with 420 patients in 2019. Nonetheless, the health crisis did not put a stop to the many projects of Institut Curie underway abroad.

Institut Curie’s expertise in Tanzania

The year 2020 saw the concretization of Institut Curie’s supporting mission to the Tanzania Comprehensive Cancer Project (TCCP), which was launched in 2018. This program is based on a public-private partnership between the Agence française de développement (AFD; French Development Agency), Ocean Road Cancer Institute (ORCI), University Hospital Center (CHU) of Bugando de Mwanza, as well as CHU of Muhimbili and Aga Khan of Dar Es Salam. This program’s mission is to further raise awareness among Tanzania’s population about cancer and thereby improve the diagnostic approach, as well as access to treatments. Indeed, because of insufficient or non-existent cancer screening, Tanzania declares 20 less cancers cases than France, while its population size is quite similar to that of France. Institut Curie is mandated to track how the money assigned to this project is spent, namely €10 million awarded to the AFD, plus €3.3 million provided by the Aga Khan Foundation, sums which are paid out over a period of 4 years. Given this setting, Institut Curie participates in the project’s steering committee, and it is additionally requested to identify the local training needs, along with ensuring timely intervention of medical specialists, technicians, and nurses from Institut Curie. For example, training sessions are scheduled to help attendants gain expertise in using radiotherapy equipment, which the hospital will purchase, or in operating the modern anatomo-pathological laboratory.

Enhanced support for Lebanon

While already present in Lebanon via a Public Health Master Class, shared by Institut Curie and ESA Business School (École supérieure des affaires) in the Middle East, in addition to agreements signed with Hôtel-Dieu de France Hospital in Beirut and Notre Dame des Secours University Hospital Center, Institut Curie has also launched supportive care projects in the field of oncology for Lebanese doctors. Considering this country’s economic and health situation, which was further aggravated by the explosion in Beirut’s port in August 2020, Institut Curie has implemented a welcome program for Lebanese practitioners, the Fellowship Curie, which has been financed at €500,000. What about its rationale? The Fellowship Curie is meant to enable six Lebanese physicians to attend Institut Curie in France, for a one-year period, in order to complete their oncological training among the different specialty teams, including surgery, radiotherapy, medical oncology, or diagnostic working groups. All their fees, including travel, housing, salaries, and others, will be paid by Institut Curie. The first two Lebanese physicians arrived in Paris in April 2021. This initiative has attracted the support of Expertise France in view of the development of a training program on site in Lebanon, which focuses on five major oncology topics. This program is scheduled to be delivered before the end of 2021.

“The project in Tanzania will change the lives of the sick population in that country. We have a lot of support work that goes beyond the hospital setting. It is a mission that is in keeping with the Curie spirit of support and the sharing of knowledge. It will take place over four years.”

Dr Pierre Anhoury, Director of International Relations

Focus

Foreign patient profiles

The COVID-19 situation favored European patients (30%) over patients from North Africa (25%) - Algeria, Morocco, Tunisia, Egypt. Patients from Asia were not able to travel. Patients’ reasons for travel were predominantly breast cancer (45%), followed by brain tumors (12%), sarcomas (10%) and eye cancer (10%), since Institut Curie is a world reference center for this disease.
The generosity of donors is the lifeblood of Institut Curie

Throughout the health crisis, donors have continued to support Institut Curie, enabling it to pursue innovative projects and acquire high-tech equipment to better serve patients.

In 2020, the COVID pandemic highlighted the need to stay healthy, as well as the fact that the fight against cancer remains a major public health concern. Thanks to the generosity of its donors, Institut Curie has been able to pursue its missions of both patient care and research.

Numerous donations for the fight against cancer

Donors have been active over the past year, thanks to the option of online fundraising, which has increased by 34%, compared to 2019 and 60,000 new donors have joined Institut Curie’s fight against cancer. Regular donations via automatic monthly direct debit were similarly of great help. Overall, 27,000 people provide regular donations to the institution, which is 5% more than in 2019.

Acts of generosity

Overall, 86 research teams and 18 technological platforms received donations, which helped them weather the impact of the health crisis. After being put on hold during the first lockdown, the research programs started up again. Overall, the funding of €650,000 allowed us to launch restructuring and emergent projects. In addition, these donations served to finance “physician-researcher” programs in the amount of around €2 million. To cite only two examples: The Elisabetta Marangoni project has paved the way for a new therapeutic modality for patients suffering from triple negative breast cancer, while the creation of a new therapeutic team around Florence Cavalli, working in the field of computational biology and integrative genomics of cancers, was instrumental in investigating the heterogeneity of secondary tumors in relation to gliomas observed in adults. A total budget of €2 million has helped develop supportive care projects, and an additional sum of €800,000 was used to buy high-tech equipment required by researchers for their studies, such as new microscopes for the Nikon Imaging Center and a new sequencing system such as Sequel II of PacBio.

> Course des Lumières night run

On November 21, 2010, the traditional Course des Lumières night run through Paris, started by Institut Curie, went smart. 2,000 walkers and runners signed up online. They were able to take part in the warm-up and various events online from their homes before lighting up the night against cancer. The 2020 edition raised €60,000 in donations for cancer research.

> Children without Cancer race

3,000 runners set off, on September 27, 2020, for the 9th edition of the Children without Cancer race organized by the childhood cancer association Imagine for Margo. This event, organized online for the first time, raised €1.325 million. Donations are allocated to six research programs. Two of these are run by Institut Curie researchers: Prof. François Doz (AsiDNA™ clinical trial on high-grade gliomas) and Franck Bourdeaut (EpiRT program on rhabdoid tumors), sharing €1.08 million in funding.

> Balenciaga against breast cancer

For the first time, the famous brand Balenciaga has joined forces with Institut Curie in the fight against breast cancer. As part of Pink October, the French fashion house has created a capsule collection entitled “We are Pink”, comprising t-shirts, sweatshirts and jewelry. And because the fight against breast cancer has no borders, Balenciaga boutiques around the world have shown solidarity with the pink ribbon. Ten percent of the profits from the collection have been donated to Institut Curie.
Focus

Institut Curie also receives generous donations from associations, community partners and even individuals, following the organization of charitable events against cancer. Although fewer in number than in 2019, these events nevertheless raised important funds for research and medical innovations carried out by Institut Curie. The association Les Bagouz’ à Manon, founded in 2005, takes part in the Course des Lumières night run every year, and also sells jewelry made by its founder, Anne Herbert, to raise money for research into neuroblastoma led by pediatrician Dr. Gudrun Schleiermacher, physician-researcher in the Pediatric Oncology Department and Deputy Director of Translational Research at the SIREDO center at Institut Curie.

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Corporate activities

This year, the corporate world has once again contributed to the fight against cancer. In March, the Monoprix Group sold a charity capsule collection of clothes and accessories, with the proceeds donated to Institut Curie. Round-up at checkout initiatives by retailers Truffaut and Monoprix also raised funds, as did salary round-ups, implemented by 17 partner companies in agreement with their employees. This initiative raised almost €500,000 in 2020. In total, Institut Curie can count on 70 patron and partner companies, including the L’Occitane Foundation, which has contributed to fighting neuroblastoma in children since 2018.

Major donors still stepping up

As part of Institut Curie’s flagship MC21 Campaign, the eleven members of the campaign committee work tirelessly every year to mobilize major donors, companies and foundations in support of ambitious projects making great strides in the fight against cancer. These include the SIREDO center, the Single Cell project and the development of chemical biology research into metastatic cancers. And to assist Institut Curie medical personnel during the pandemic, the campaign committee provided employees with masks and cosmetic products from L’Oréal in thanks for their outstanding dedication.

For more than 16 years, our association Les Bagouz’ à Manon has supported research in pediatric oncology at Institut Curie, via the SIREDO center. The association has taken part in the Course des Lumières since its creation, and has won the group fundraising challenge for the last three years. Throughout the year, the association also donates funds collected through various events for the SIREDO center. We have developed a strong friendship with Institut Curie over the last 16 years. It is rooted in loyalty and the satisfaction of raising these funds in the hope that no more children will die of cancer!”

Anne Herbert-Bertonnier, President of the association “Les Bagouz’ à Manon”

“For over 20 years, L’Occitane has been a dedicated supporter of initiatives combating preventable blindness. In 2020, the company even far exceeded its objective of more than 10 million eye care recipients! These programs to fight preventable blindness are cofunded by the L’Occitane Foundation and actively involved subsidiaries and production sites. In 2020, the Manosque site and the L’Occitane Foundation contributed to the purchase of a wide-angle digital camera for Institut Curie. This device is essential for the care and treatment of children with retinoblastoma. L’Occitane is proud of the role it plays in helping Institut Curie in its fight against preventable blindness in children.*

Sophie Genin, General Delegate of the L’Occitane Foundation

*Of which 11.1% are capital transactions (investment, loan repayments)
Social missions (care, research, conservation and transmission of knowledge)
Public appeal fees
Operating costs

“Despite the difficulties caused by the health and economic crisis, our campaign committee continued to act throughout 2020, providing support to medical personnel in the form of 5,000 masks and over 2,000 cosmetic products from L’Oréal. The campaign committee also continued its strategy focusing on major private donors, companies and foundations in support of ambitious projects making great strides in the fight against cancer, resulting in new sources of support. Nevertheless, the MC21 Campaign is still ongoing and we must step up our efforts to reach our goals under the flagship MC21 project.”

Frédéric Donnedieu de Vabres, MC21 Campaign Committee Chairman
The doors were closed but knowledge kept on spreading!

While the Musée Curie’s doors were closed for part of the year, the museum’s teams did not miss a beat, continuing to bring Curie’s cultural heritage to life. Projects included interactive comics, preparation for the Foundation’s centenary celebrations, and showcasing of street arts.

Due to the health crisis and subsequent lockdowns, numerous cultural sites have now adopted digital technology, and the Musée Curie has also followed this trend. Taking advantage of the museum’s closure, the teams issued an interactive online comic, among other things, even published earlier than scheduled, entitled “The Curie Method*”. Dedicated to the scientific heritage of the Curie family, this comic is directed by Maya, a virtual mediator. Maya leads the reader through the museum, beginning with the story of Pierre and Marie Curie, introducing us to radioactivity measuring devices. This documentation can now be consulted online, but also during a live visit to the museum.

Showcasing the present and future
At the dawn of 2021, the year that will mark the centenary of the Fondation Curie, the museum’s teams have been working hard to prepare an exhibition, which will not all be online. It aims to look back at the group’s history up until now, while featuring the different teams working at Institut Curie. An excellently-researched book has been published under the direction of Natalie Pigeard-Micault, a historian who is also in charge of the museum’s historical sources. The museum’s exterior is as interesting as its interior, and the garden and facade work - designed by street artist C215 - have had 14 notices added. Created in partnership with “École du Louvre Junior Conseil”, these texts give pointers to help explain these portraits in the history of street art.

The museum in the media
While forced to keep its doors closed, the Musée Curie welcomed several film crews and actively took part in various audiovisual projects. The documentaries “Le Paris de Marie Curie” for channel TV5 Monde, “Blum et ses premières ministres” for France 3, as well as news broadcast for France 2 for the presentation of Marjane Satrapi’s film “Radioactive”, which was produced in partnership with Institut Curie, as well as other live programs, including “La méthode scientifique” (The scientific method, France Culture), and “Historiquement vôtre” (Historically yours, Europe 1).

“Our new enhanced comic, ‘La méthode Curie’ (The Curie Method) and its explanations in regard to radioactivity measuring devices was well received by both the general public and Pierre and Marie Curie’s descendants, in addition to the DRAC**, which subsidized the project. It is a beautiful digital mediation and knowledge diffusion tool,” Renaud Huynh, Director of the Musée Curie.

* lamethodecurie.fr
** Regional Directorate of Cultural Affairs
Our economic model

Public funds play an essential role in the financial funding of Institut Curie, whereas private funds from public donations and bequests also ensure its independence and are a driver of innovation designed to further accelerate discoveries in order to benefit patients.

Business model of the Hospital Group and the Research Center

- **6%** Public generosity
- **16%** Other resources
- **78%** Health insurance

**Financial contributions by social mission**

- **€323.8 M** or **81%** of total revenue
- **€75.6 M** or **19%** of total revenue

**THE RESEARCH CENTER’S RESOURCES**

- Research bodies (CNRS, Inserm, and universities): part of staff costs, operating costs, or investments costs.
- Annual subsidy from the Ministry of Higher Education, Research, and Innovation.
- Public and quasi-public funding in response to calls for bids: Agence Nationale de la Recherche (ANR), Institut National du Cancer (INCa), Ile-de-France regional council, European Research Council (ERC) and European Commission.
- Private funding: benefactors, charity organizations (Ligue contre le cancer, Fondation pour la Recherche Médicale...), industrial players for licenses, collaborations and partnerships.
- Public generosity (donations and bequests).

**THE HOSPITAL GROUP’S RESOURCES**

- The French health insurance fund (Assurance Maladie), as an institution of private care in the public interest, (Esppic) through pricing per activity (T2A), contribution to programs of general interest, as well as contracting assistance (Migac).
- Billing treatments to patients without national health insurance, including those coming from outside the European Union, copays, and daily flat rates.
- Industrial players, benefactors, charity organizations, as well as public, semi-public, or para-public organizations for clinical research and innovation.
- Public generosity (donations and bequests).

**THE HEAD OFFICE’S RESOURCES**

- Financial assets related to Institut Curie’s cash resources. Maintaining a certain cash resource threshold enables Institut Curie to finance its support and administrative services, thereby limiting the use of public donations.
- Public generosity and CNRS finance the Musée Curie, one of the foundation’s social programs.
- Technology transfer incomes.
- Income related to international consulting business activities.
- Income related to use of the “Curie” name.

**ASSET MANAGEMENT**

**INTANGIBLE ASSETS**

Institut Curie holds a portfolio of trademarks and a portfolio of patents. The latter protects inventions resulting from research conducted within the Foundation. These assets are not capitalized in the balance sheet. The rights attached to the patents are granted to third parties (industrialists, biotechnology companies) through the granting of exploitation licenses.

**REAL ESTATE ASSETS**

Institut Curie owns the buildings on three sites located in Paris, Orsay and Saint-Cloud, where its social missions are carried out. Additional premises are leased to accommodate tertiary activities. Institut Curie does not own any investment property.

**OTHER FIXED ASSETS**

In most cases, Institut Curie owns the assets required for its activities, including in most cases heavy healthcare equipment and research apparatus. Exceptions include, four items of radiotherapy equipment and two items of imaging equipment which are leased.

**FINANCIAL ASSETS**

Comprising a portfolio of investment securities, they are intended to ensure the long-term viability of Institut Curie’s activities, while providing the resources needed to carry out its general interest missions. Their management is governed by a reference framework that was updated, following its implementation in 2018, of Institut Curie’s new statutes. In accordance with the basic principles of prudence, a wide diversification of the types of products and investment options is systematically sought. The securities portfolio is managed by the Executive Board, which has set up a financial committee to monitor investments and make recommendations. Management of medium and long-term assets is delegated to service providers selected following consultation. Cash management remains in-house. The recently initiated policy of socially responsible investment is continuing, as is the diversification into real estate through shares in non-trading real estate investment companies (SCI).

The annual report on financial management, as well as management rules and investment strategy, with an indication of the associated risks, are submitted annually to the Supervisory Board for approval.
Institut Curie at a glance

Institut Curie’s governance includes a Supervisory Board, a Scientific Advisory Board, an Executive Board, and three entities, namely the Hospital Group, the Research Center and the Head Office.

The Supervisory Board

THREE FOUNDING MEMBERS ACTING IN AN ADVISORY CAPACITY
- Prof. Stewart Cole, representing Institut Pasteur
- Marc Joliot, representing the Curie family
- Daniel Thierry, representing the Rothschild family

SIX EX-OFFICIO MEMBERS ACTING IN AN ADVISORY CAPACITY
- Jocelyne Bérille, representing the French Ministry of Higher Education, Research, and Innovation
- Prof. Gilles Bloch, representing the French National Institute of Health and Medical Research (Inserm)
- Jean-Guy de Chalvron, representing the French Ministry of the Interior
- Dominique Joseph, representing the French Economic, Social and Environmental Council (CESE)
- Prof. Norbert Ifrah, representing the French National Cancer Institute (INCa)
- Yvan de Launoit, representing the French National Centre for Scientific Research (CNRS)

FIVE EXPERTS ACTING IN AN ADVISORY CAPACITY
- Frédéric Donnedieu de Vabres
- André Gauron
- Prof. Jean-François Girard
- Mireille Guigaz
- Philippe Louis-Dreyfus

FOUR STAFF REPRESENTATIVES ACTING IN AN ADVISORY CAPACITY
- Sébastien Goud
- Valérie Sire-Trotin
- Prof. Nathalie Cassoux for the Hospital Group
- Fatima Mechta-Grigoriou for the Research Center

SIX OTHER MEMBERS WITH VOTING RIGHTS
- Alain Fuchs, representing the PSL University
- Samuel Guibal, representing the Paris Local Education Authority
- Prof. Xavier Jeunemaitre, representing the Université de Paris
- Marie-Christine Lemardeley, representing the city of Paris
- Jean-Christophe Prion, representing the city of Saint-Cloud
- Gérard Wormser
The Scientific Advisory Board

Distinguished people

- Prof. Iain MATTAJ
  Chairman of the Scientific Advisory Board
  Director of Human Technopole – Milan (Italy)

- Prof. Alain FISCHER
  Vice-Chairman of the Scientific Advisory Board
  Director of the Research Institute of Genetic Diseases (Imagine), Hospital Necker-Enfants Malades, Université Paris Descartes, UMR INSERM 1164.
  Professor at Collège de France, Chair of “Médecine expérimentale” – Paris (France)

- Prof. Anton BERN
  Senior Staff Member, Division of Molecular Genetics
  The Netherlands Cancer Institute – Amsterdam (The Netherlands)

- Prof. Robert G. BRISTOW
  Manchester University, Professor of Cancer Studies,
  Director of Manchester Cancer Research Center – Manchester (United Kingdom)

- Prof. Pascale COSSART
  CSIC Fill Professor Instituto de Neurociencias (CSIC-UMH) –
  School of Medicine, Director of the Mount Sinai Human Immune System Inst (New York, United States)

- Prof. Paul NURSE
  Director of the Francis Crick Institute – London (United Kingdom)

- Prof. Martine PICCART
  Professor in Oncology at the Université Libre de Bruxelles and Head of the Department of Medicine at the Jules Bordet Institute – Brussels (Belgium)

- Prof. Jody ROSENBLATT
  Director of the Francis Crick Institute – London (United Kingdom)

- Prof. Lucile Alexandre
  PhD MicroNanoFluidique Prize 2020
  Macromolecules and Microsystems in Biology and Medicine (IMB-M) team (CNRS UMR168 / Sorbonne University)

- Prof. Jean-Léon Maître
  Treatment Approaches team (Inserm)
  Chevalier de l’ordre national du Mérite / Anne Houdusse
  De la reproduction / of the Fédération française d’études de la reproduction

- Prof. Alexandre MASET
  Chair Cancer Committee
  Dr. Luca GIANNI
  European Molecular Biology Laboratory (EMBL) –
  Head of the Genome Biology Unit, Senior Scientist
  Dr. Eileen E.M. FURLONG
  •
  (Inserm U604 / INRA USC2020) –
  Professor at Institut Pasteur, Head of the Bacteria-Cell Interactions Unit
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  Manchester University, Professor of Cancer Studies,
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- Prof. Kai JOHNSON
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