Feature

10 years of progress and innovation in the service of patients

Portrait
The efficiency and appeal of the Paris Brain Institute model

Technologies and applications
When research meets tomorrow's health

Generosity
Make your taxes a powerful accelerator of progress
The year 2020 marks the tenth anniversary of our Institute. A lot has been accomplished during this period that already seems so far away and yet so very near.

Even if the ICM is still young, its reputation has grown steadily over the years, and it is thanks to the commitment of each and every one of its founders, researchers, donors, partners and volunteers, who, through their support and commitment have enabled our remarkable institute to become one of the leaders in neuroscience research. While not yet widely publicised in the media, many discoveries have nevertheless been the subject of fundamental advances in the scientific world.

It is now time for the ICM to embark on a new phase of its development. The ICM has become the Paris Brain Institute. It’s as simple as that. This is not a radical change but merely an evolution, because we are not abandoning the spinal cord, that essential relay of the gigantic amount of information that circulates in our body every second. We are moving towards greater clarity with regard to the general public.

Our logo will also evolve somewhat in a spirit of modernity, but we will maintain the acronym “ICM” because we have existed as ICM for more than ten years, and there is no forgetting our history, which has been behind some very significant advances in the nervous system and its pathologies.

The Institute’s researchers and I wish to extend our heartfelt thanks to you for your loyal support, which has allowed them to continue their research work over this decade, and I hope for the next ten years to come.

What’s new in your newsletter

On the occasion of the Institute’s 10th anniversary, we wanted to give new momentum to your newsletter by changing its name to Synapse. It symbolizes the link, the connection between you and the Paris Brain Institute. This new name is also intended to give your newsletter its own identity and to make it stand out more clearly among our publications.

Ageing gracefully

In his latest work, Prof. Yves Agid, neurologist and co-founder of the Paris Brain Institute, takes a light-hearted look at advances in the understanding and treatment of neurodegenerative diseases. Actually, aging is not a disease, it depends on your brain. A highly recommended and easy-to-read book! Je m’amuse à vieillir, by Prof. Yves Agid, Odile Jacob, 290 pages, €22.90.

Unlocking the possibilities of gene therapy for the brain: Janssen Horizon is sponsoring an innovative project by Nathalie Cartier’s team to the tune of €467,500.

The project funded up to 2022 aims to validate the safety and efficacy of a protocol to improve the passage of the gene therapy vector in the brain via the transient opening of the blood-brain barrier (BBB). A promising approach for numerous neurodegenerative diseases.

Established in 2016 by Janssen Pharmaceuticals, the Janssen Horizon Endowment Fund aims to foster the emergence of a translational research ecosystem to bring new solutions and treatments to patients.

https://janssennhorizon.org/

Braincast, giving voice to neurons!

Discover our series of podcasts, Braincast, produced in partnership with Cerveau & Psycho magazine. Hosted by Sébastien Bohler, PhD in neuroscience and editor in chief of Cerveau & Psycho, these podcasts will take you on a journey of discovery of a Paris Brain Institute researcher, his life and his career. It is THE venue for all those interested in the current development of neurosciences.

Available in French at www.cerveauetpsycho.fr/fr/brain-cast or the Brain Institute website, and the online music platforms (iTunes, Spotify, Deezer, Apple podcasts...).

Since 2010

248 clinical trials

of which 147 are scheduled for 2020

Innovation

The ICM becomes the Paris Brain Institute

Our new name will be launched in mid-March and will be complemented by the launch of a poster campaign offered by our partners JC Decaux and PUBLICIS. The aim of this campaign is to make the general public aware of the vital importance of this fascinating organ, the most complex in the human body. It manages our social behaviour, our actions and our emotions, and controls our movement and mobility. Without it we could not dream, think, move, write, imagine, speak, create... It is what makes each of us “remarkable”!

This campaign pays tribute to the institute’s scientists and doctors who, thanks to your support, have undertaken research work to better unravel its mysteries.

News

A new therapeutic approach to brain tumors, the meningeval lymphatic network.

Cerebral anoxia and resuscitation seen in real time from inside the neurons.

Video

www.youtube.com/BrainSpineInstitute

Donor conference on Brain Tumours on December 18, 2019


Agenda

Donor Conferences as part of la Semaine du cerveau (registration required)

Wednesday 18 March 2020

9:30: The Paris Brain Institute confronting the major challenge of the 21st century: nervous system diseases.

13:30: Major advances and expectations for the cure of neurodegenerative diseases.

Saturday, March 21, 2020

10:30: Everything you ever wanted to know about how the brain works.

Semaine du cerveau at the Paris Brain Institute

Open to the general public, mandatory registration (semaineducerveau@icm-institute.org), workshops and conferences. Launch of the exhibition “10 years”
Transdisciplinarity, efficiency and appeal of the Paris Brain Institute model from the perspective of its researchers.

Stéphanie Baulac joined the Paris Brain Institute in 2011 as a research group leader in Prof. Eric Leguen’s team. She is now a member of the scientific steering committee, Inserm research director, scientific director of the iGenSeq technological platform and co-leads the Genetics and physiopathology of epilepsy team.

The Paris Brain Institute has been a wonderful springboard for me to both further my research and develop my career. My research projects have benefited from close collaboration with clinicians - researchers and the access to human biological samples, but also from the expertise of the Institute’s platforms, notably the iGenSeq platform, equipped with a state-of-the-art sequencer, the CELIS e-PHYS platform for recording the electrical activity of neurons, and the video-EEG platform for recording epileptic seizures.

By combining results obtained on human tissue in cellular and experimental models, we have contributed to the identification of new physiopathological mechanisms in focal epilepsy in children.

Finally, the growing reputation of the Paris Brain Institute and the support of the scientific and medical affairs and communication departments have contributed considerably to developing the scientific visibility of my research, facilitating the securing of grants and awards to continue my work.

Jaime de Juan-Sanz arrived at the Paris Brain Institute in November 2019, following a postdoctoral associate appointment at Cornell Medical College in New York, he holds The Diane Barrière Chair “Molecular physiology of synaptic bioenergetics”. The donation by Dominique Desseigne and his children funded this chair, which made it possible for the Paris Brain Institute to welcome this young talent from abroad.

What attracted me most to the Paris Brain Institute was the ease with which I could easily establish cooperation with other teams working on my research theme, epilepsy, but with different approaches to mine. I already see opportunities for joint research work with the Stéphanie Baulac and Stéphane Charpier teams.

Here, I can also approach research on a more fundamental level, such as understanding the normal functioning of synapses in order to apply it to my research through interaction with other researchers at the institute.

Jaime de Juan-Sanz, Stéphanie Baulac

Research feeds on success but also on the failures of the projects carried out. A negative result makes it possible to exclude initial hypotheses and suggest new ones. In ten years, researchers at the Paris Brain Institute have carried out more than 3,300 projects, with results published in scientific journals. Each of these projects represents the same number of metres gained in understanding the brain and in the fight against neurological and psychiatric illnesses.

Jaime de Juan-Sanz & Stéphanie Baulac

“The strength of the Paris Brain Institute lies in the multidisciplinary approach of its research”

Jean-Yves Delattre, Medical director of the Paris Brain Institute

10 years of progress and innovation at the service of patients
Observe and model the brain to target early dysfunctions

- The development of innovative technologies to perceive what is invisible like the repair process of multiple sclerosis lesions (2018), presymptomatic spinal cord impairment in frontotemporal dementia and Charcot’s disease or ALS (2019).
- The detection of neuronal discharges preceding epileptic seizures (2011).

Putting patients at the heart of research to improve their therapeutic management and their daily life

- The development of computational prediction methods of behaviour based on the location of a cerebral lesion (2019), post-stroke sequelae (2018) and the evolution over 4 years of symptoms in Alzheimer’s disease (2019).
- The development of treatments such as deep brain stimulation in patients with Tourette’s syndrome (2016, 2017) or Parkinson’s disease (2016).
- The optimization of treatments in brain diseases by transient opening of the blood-brain barrier using ultrasound (2016).
- Home-based follow-up, rehabilitation and improvement of patients daily life
  - The design of smart and connected clothing for the diagnosis and monitoring of epilepsy (2017).
  - The development of a virtual companion for the psycho-education of depressed patients, VIK Dépresse (2019).
  - The creation of a LivingLab, a venue for dialogue between researchers, clinicians and patients, providing patients with therapeutic innovation such as an anti-freezing cane for Parkinson’s patients, or an AI designed robot for the home rehabilitation of brain-damaged patients (2015).

Genetic causes

Cellular causes
- The demonstration of the major role of immune cells in diseases of the central nervous system such as Multiple sclerosis (2011, 2017), Alzheimer’s disease (2016) and Parkinson’s disease (2018).

Brain development
- The identification of essential mechanisms in the production and renewal of neurons (2018).
- The complete mapping of cerebral functional lateralisation (2019).
- Highlighting the major role of the frontal lobe in motor and social behaviour (2016).
- The identification of brain regions involved in mood changes and decision-making (2018).
- The correlation between sleep and memory processes (2016, 2017).
- The identification of cerebral motor regions (2014).

Cerebral architecture and major cognitive functions
- The identification of cerebral motor regions (2014).

Our greatest achievement is to have encouraged and fostered collaboration between researchers and clinicians over the years, in order to study each disease through a very broad prism, from molecular and cellular dysfunctions to the motor and cognitive deficits presented by patients. Some examples of advances illustrating this multidisciplinarity include:

- Understanding the healthy brain to better address its deficits
- Identifying the causes to better treat the effects

With a unique ecosystem combining fundamental and clinical research, technological platforms at the cutting edge of innovation and a solid partnership with the business community, the Paris Brain Institute has become a leading player in neuroscience research over the past ten years.

More information
www.icm-institute.org
The Paris Brain Institute is now a leading institute in neuroscience: what’s the next step?

A. B. To build a dynamic ecosystem, we need to continue recruiting the most talented researchers. Focus on the development of new technologies, have the most efficient tools, because they are the ones that allow us to push back the frontiers. We also need to approach questions related to the functioning and pathologies of the nervous system from different angles, to do so we need specialists from various disciplines. Our capacity to bring researchers together at the interface of their discipline generates new concepts.

B. H. To create a barrier-free environment in which people interested in all aspects of the brain, from molecules and circuits to cognition and disease, work together to create a seamless circle of knowledge between the patient’s bed and the laboratory. We also want to break down the barriers between idea-driven and technology-driven research. Technological advances almost always create opportunities to ask and answer new questions, to delve deeper, to see more clearly and to do things faster.

J.-Y. D. Thanks to the Paris Brain Institute in conjunction with the Neuroinformatics teams, we have been able to establish large cohorts of patients studied at an early stage, even before the onset of disease. It is a very powerful tool, we are starting to exploit the data and we need to put the accelerator on it because it promises huge advances.

What do you see as the major challenges facing the Paris Brain Institute in the coming years?

A. B. To develop artificial intelligence tools for customised medicine as well as preclinical models that are a more accurate reflection of human pathology, in order to better understand the mechanisms involved and to act on the right targets. We also need to boost research through new technologies with the acquisition of cutting-edge equipment such as a 7-tesla MRI for brain imaging.

B. H. At present, the time between an initial discovery and the benefit to society is about thirty years. Our challenge is to halve this time. To do so, we must make our model sustainable and even more productive.

J.-Y. D. The challenge that awaits us and against which we can always improve, is that of increasing the number of inclusions in clinical trials. For every patient we see, we must be able to not only help them here and now with the treatments available, but also to offer them the opportunity to participate in trials of innovative therapies to advance the understanding of diseases and their treatment.

3 questions for... Alexis Brice, Executive Director of the Paris Brain Institute, Bassem Hassan, Scientific Director, and Jean-Yves Delattre, Medical Director.

Ten years after the creation of the Paris Brain Institute, in your opinion, which milestones in Institute life have inspired great hope?

A. B. In 10 years, the development of the Paris Brain Institute’s scientific influence has been considerable and in recent years with the recruitment of outstanding teams it has accelerated considerably. The presence of these high-level researchers has been indispensable in creating a truly dynamic, state-of-the-art ecosystem. It also paves the way for collaboration with the best in their respective fields on a global level, to pool our strengths and boost our research efforts. In addition, the award of the IHU label, this translational research programme and its recent renewal, as well as the renewal of our research unit, are true marks of recognition from national research evaluation institutions.

J.-Y. D. We have succeeded in structuring our clinical research, establishing a strong link between the clinical services of the Pitié-Salpêtrière Hospital and the Paris Brain Institute. We can now consider our clinical services as the armed wing of the Institute’s clinical research. The creation of the Paris Brain Institute’s clinical research infrastructures, the ICRINs, which consist in evaluating clinical teams and giving them the means to work better, will make it possible to implant the culture of our research into our clinical divisions, leading to significant breakthroughs for patients.

B. H. The possibility of taking risks in the way we conduct our research! Major discoveries, those that involve significant differences, are by definition unexpected and unpredictable. They require that researchers be given the opportunity to let their creativity flourish and to conduct research outside traditional approaches. The challenges arising from brain diseases remind us every day how essential it is for us to question existing paradigms and to rework our models.

J.-Y. D. At present, the time between an initial discovery and the benefit to society is about thirty years. Our challenge is to halve this time. To do so, we must make our model sustainable and even more productive.

Let’s talk about children’s brain diseases!

Email us your question or experience on the special feature theme in our next issue, children’s brain diseases, and you may be published in the June issue of Synapse. contact@icm-institute.org
A part from Chinese characters, almost all reading systems are based on the principle of writing the sounds that make up the words in their spoken form. How do you write a sound in French, for example the “o” sound? The answer that immediately comes to mind is that it is the letters that play this role. Actually this is not really the case.

Let’s take the example of the word “chapeau”, consisting of four sounds (ch + a + p + o), but with seven letters. Linguists use the term grapheme to designate the writing of a sound. In the word “chapeau”, there are four sounds corresponding to four graphemes which are CH, A, P, and EAU.

In a study carried out at the Paris Brain Institute, Florence Bouhali and Laurent Cohen** identified a tiny region of the cortex specifically responsible for the recognition of graphemes and whose role in reading appears essential. This region is located within a larger area responsible for the recognition of objects in general and occupies the underside of the entire rear part of the brain. It contains small specialized areas, which are mobilized notably in the recognition of faces or places, but also graphemes. The “grapheme” region is located in the left hemisphere, where the entire language system generally resides. Once the graphemes are recognized, this allows the information to be sent quickly to the language regions, which will transform them into sounds.

In conducting this study, Laurent Cohen’s team investigated the reading mechanisms in adults. In fact, the visual cortex specialization for grapheme recognition does not exist at birth, and probably appears while children are learning to read. While it has yet to reveal all its mysteries, the grapheme region remains a striking example of the brain’s ability to change and adapt.

**“PICNIC team: Physiological investigation of clinically normal and impaired cognition” co-directed by Paolo Bartolomeo (Inserm) and Lionel Naccache (AP-HP/Sorbonne University).
When research meets tomorrows health

Established in 2012 by the Paris Brain Institute, the iPEPS incubator - Healthtech Hub hosts young innovative companies to develop new health solutions.

The Paris Brain Institute incubator is the first acceleration site for innovations targeting nervous system diseases in France. Like the Institute, the iPEPS - Healthtech Hub offers a cross-disciplinary approach to healthcare with its model bringing together researchers, doctors, patients and start-ups. Located within the Institute and at Station F, the world's largest campus dedicated to start-ups, these new healthcare hubs benefit from unique expertise and a hotbed of exchange, enabling ideas to be transformed into tangible solutions.

Business plan assistance, prototyping, support for clinical trials, fundraising, all the elements are there to help companies grow. To achieve this, the incubator relies on its various partners, including the public investment bank Bpifrance, the leading sponsor of start-ups in France. In 2019, iPEPS received the French Tech Seed label, rewarding its capacity to support young innovative companies.

The iPEPS incubator supports start-ups developing drugs, medical technologies and connected healthcare solutions. Several major successes have already been achieved with start-ups such as Brain-e-NOVATION, a joint laboratory for the development of therapeutic video games, or BIOSERENITY, specialising in therapeutic video games, or BIOSERENITY, specialising in therapeutic video games.

To date, 50 companies have been supported by the iPEPS team and have benefited from its environment. The incubator’s expertise and the Paris Brain Institute’s research model have enabled the creation of more than 600 jobs, promoting new solutions for the benefit of patients.

The atmosphere in Bourg-La-Reine on the weekend of November 11th was unbelievable! For the 5th year in a row, 80 players took turns on 70 different games, and for the first time ever, the event was held to raise money for the Paris Brain Institute. Once a game has been chosen and the competition objectives decided, this charity marathon, more specifically called “speedrun”, consists in completing the game in a minimum amount of time.

Guaranteed entertainment, with the presence of champions from these unlikely disciplines, such as Eraxii, the number one French player, ninth worldwide on The Legend of Zelda.

Broadcast live on the Twitch streaming platform, a reference site for video game lovers, this event was hosted by passionate gamers who explained the rules of this little-known practice to the general public, but above all encouraged donations for the Paris Brain Institute during these 72 hours.

Ambassadors who introduced spectators to the Institute and its causes produced spectators to the general public, but above all encouraged donations for the Paris Brain Institute during these 72 hours. Ambassadors who introduced spectators to the Institute and its causes enabled them to donate in large numbers, reaching the exceptional sum of €31,000!

The Paris Brain Institute would like to thank all the participants and donors for this tremendous commitment. See you next year for a new record breaker!

From 8 to 11 November, the Bourg La Run French charity video game marathon raised €31,000 for the Paris Brain Institute.

Pfizer Healthcare Hub France: convergence of expertise

In 2018, the Pfizer Innovation France endowment fund in partnership with the Paris Brain Institute and its iPEPS incubator created - the Pfizer Healthcare Hub France.

The aim of this accelerator program is to support and develop digital solutions focusing on the care path and quality of life of the patient. For the second edition of this programme, up to 6 start-ups will be accelerated within the Pfizer Healthcare Hub for nine months. In order to support their development, these young companies will attend group workshops and individual coaching sessions. A mentoring system with Pfizer France employees has also been set up, with a view to giving them access to the pharmaceutical industry expertise, in order to better understand the major issues of the sector and its ecosystem.

This type of charity event started in 2010 in the United States with the Game Zone Quick. When I set up Bourg-la-Run, I had a similar idea in mind because there was no event like it in France.

Gaëtan Young, aka “Gyoo”, former president of the organising association Le French Restream.

(excerpt from an interview in Figaro on 8/11/2019)
Your fiscal advantages are in line with the challenges we face

Are you subject to French wealth tax, income tax or corporation tax?

Make your taxes a powerful accelerator of progress

To fight Alzheimer’s disease, Parkinson’s disease, stroke, ALS and the many neurological diseases that disrupt millions of lives every year, the Paris Brain Institute must deploy human and technological resources that are equal to the task at hand.

Three fiscal devices to support your generosity

Are you subject to the IFI (French wealth tax)?

75% of the amount of your donation to Paris Brain Institute is deductible from your IFI, up to €50,000.

For example:

- €10,000: You benefit from a tax deduction of €7,500
- €2,500: Your donation amounts to:

Are you subject to French income tax?

You can deduct 66% of the amount of your donation to Paris Brain Institute from your income tax, up to 20% of your taxable income.

For example:

- €10,000: €6,600
- €3,400: And your donation amounts to:

Are you subject to French corporation tax?

60% of the amount of your donation to the Paris Brain Institute is deductible from corporation tax within the limit of €20,000 or 0.5% of the turnover if it is conducted as patronage. For a donation exceeding €20,000, the fraction of the donation exceeding this amount is 40% deductible from corporation tax.

Give meaning to your taxes

Today, thousands of generous people want to give purpose to their taxes by making a meaningful contribution to advancing research and helping the Paris Brain Institute’s teams invent the medicine of tomorrow to better prevent, treat and cure brain and nervous system diseases.

You are welcome to take advantage of these favourable tax provisions to work alongside us. Thank you for your support!

You have assets?

Transform latent capital gains into solidarity actions in favour of the Paris Brain Institute

The sudden death of our daughter at the age of 38 convinced us of the need to increase our commitment to research into neurological diseases. We have chosen to donate securities, this gives the right to the same fiscal advantages and avoids the need to sell the securities to pay the proceeds after paying the flat tax rate (PFU) of 30%. The conveyance applies to the full value of the securities transferred.

YOUR PERSONAL CONTACT

in Bureau du Cercle des Amis

Mme Lucie Moutier

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cercle@icm-institute.org

="I have already put the Brain and spine Institute with the exact address in my will and in the beneficiary clause of my life insurance. As the Institute is changing its name to the Paris Brain Institute, do I need to change these documents?"

Daniel, 71

No, you don’t have to make any changes at all to your will or your life insurance policy. Because, from a legal point of view, the institute name does not change, moreover, it retains the acronym ICM in its logo.

My advice on making a will

If you choose to draw up your own will (the other solution is to seek counsel from a notary), here are a few simple rules for it to be valid:

- your will must be completely handwritten (not typed) with no deletions, make sure to date and sign it;
- write the name and address of the beneficiary (or beneficiaries if there are several) accurately in the will. In the case of the Institute, Institut du Cerveau (or ICM), with headquarters at Hôpital de la Pitié-Salpêtrière, 47, boulevard de l’Hôpital, 75013 Paris.

As a precautionary measure, I advise you to deposit your will with a notary who will ensure that it is kept safely and will register it. This is the assurance that it will be found and that your wishes will be respected.

There is no need to wait until you’re elderly to make a will. It can be modified at any time if necessary.

If you plan to transfer all or part of your assets to the Paris Brain Institute, contact me to receive.

My wife passed away five years ago, she had Alzheimer’s disease. As we did not have children, we decided before she passed away that it was only natural that our inheritance should go to research at the Paris Brain Institute. The dedicated team assisted, guided and advised me. In this way, I was able to draw up my will in all serenity, before having it registered by my notary. It’s as simple as that.

Georges L., testator in favour of the Paris Brain Institute

I made a donation by credit card over the internet. How will I receive my fiscal receipt?

For all donations made over the internet, you will receive your fiscal receipt by email within 24 hours. If necessary, we suggest that you consult your spam folder or contact the institute's donor service at +33 (0)1 57 27 47 56 or at contact@icm-institute.org.

Can my donation to the Paris Brain Institute be deducted from the IFI?

As a foundation of recognized public utility, up to 75% of the amount of your donation to the Paris Brain Institute is deductible from your IFI, (up to €50,000).

Must I include my fiscal receipt with my income tax declaration?

No, you don’t need to include your fiscal receipt with your tax declaration. You must simply keep it in case the tax administration asks for it during a control.
Our brain, a masterpiece worth protecting

Your brain is an organ as precious as it is mysterious. Your freedom of thought as well as your freedom of movement depends on it. While diseases of the nervous system currently affect 1 in 8 people, at the Paris Brain Institute, scientific experts from around the world strive to discover and rapidly develop innovative treatments that will directly benefit patients. While sometimes challenging preconceived ideas, the Institute’s 700 researchers investigate new avenues of research and push back the limits of knowledge in order to discover tomorrow’s cures for Alzheimer’s disease, Parkinson’s disease, epilepsy, ALS, strokes, brain tumors, multiple sclerosis, mental disorders, tetraplegia, etc.

Invest intelligently in the future to fight diseases of the nervous system. Activate the progress of brain research by making a donation at icm-institute.org

75% of the amount of your donation is deductible from the IFI. 66% of the amount of your donation is deductible from French income tax.