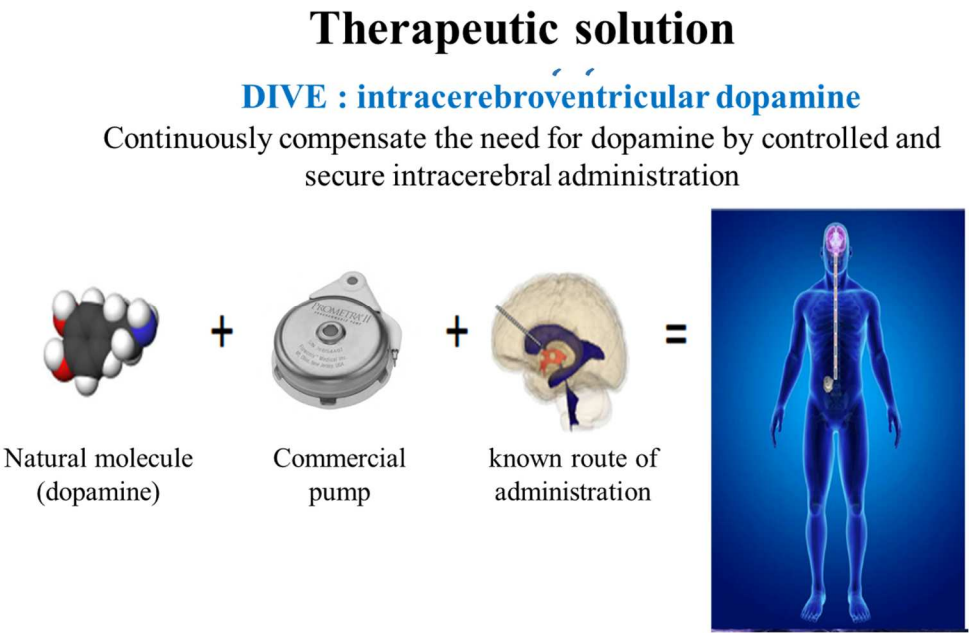
Communiqué de Presse

Lille, le 8 avril 2022

World premiere:
A clinical trial allowing direct delivery of dopamine to the brain shows excellent results in treating Parkinson's disease

Currently conducted at the Lille University Hospital, DIVE is a revolutionary clinical trial on Parkinson's disease. It is based on the development and evaluation of a new system for administering the treatment of the disease by infusing the missing dopamine directly into the brain in order to limit the side effects of conventional treatments. An original manufacturing process is thus being produced for the first time at the Lille University Hospital. This new technology was developed by InBrain Pharma, a start-up created to exploit the initial concept resulting from academic research at the Lille University Hospital, the University of Lille and the Lille Neuroscience & Cognition UMR-S 1172 Inserm laboratory. The technology transfer was carried out by SATT Nord with incubation at Eurasanté.

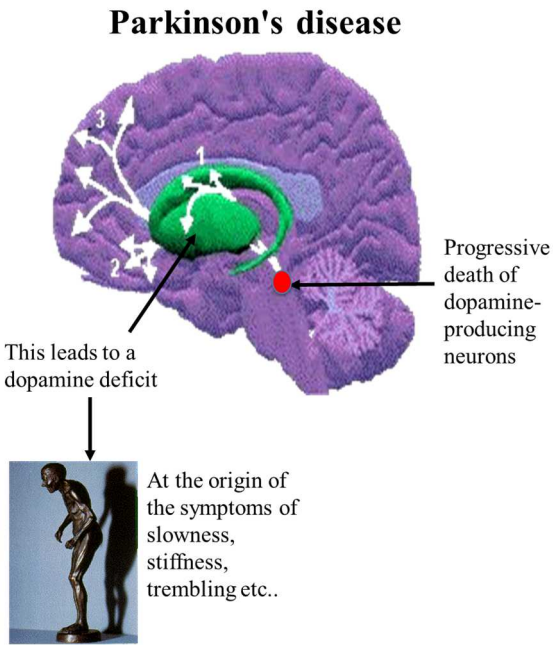


« A dive into the brain to better treat the disease, based on the model of continuous insulin administration in diabetic patients.»

Professor David DEVOS, Lille CHU, Lille University, Lille Neuroscience & Cognition INSERM and co-founder of InBrain Pharma.

Parkinson : a common neurodegenerative disease due to the death of dopaminergic neurons, responsible for important motor disorders.

Parkinson's disease currently affects 200,000 people in France, including **22,000 cases in the Hauts-de-France region** and more than 8 million worldwide. This disease causes a lack of dopamine in the brain. To compensate for this deficiency, **the current treatment is based on repeated oral intake of L-Dopa**, which is then transformed into dopamine. **This oral treatment has a limited duration of action and causes very disabling motor complications in 50% of patients after 5 years and in 80% of patients after 10 years**. Patients fluctuate constantly between periods of overdose characterized by uncontrolled movements, periods of good control and periods of underdose with the resurgence of the signs of the disease (slowness, stiffness, tremor, pain, malaise, anxiety...). At this stage, few second-line treatments can be offered to patients.



InBrain Pharma's valuable partnership with the University Hospital of Lille for a new therapeutic solution by continuous administration of dopamine

« Since patients lack dopamine, the ideal treatment would be to bring it directly to their brain. However, dopamine is a fragile molecule, which oxidizes and degrades very quickly in the open air. Therefore, we had the idea to develop its administration in anaerobic conditions (without oxygen to preserve it) and intracerebrally, to patients suffering from Parkinson's disease at the stage of complications of the oral treatment (after 5 to 10 years of evolution). Called DIVE for IntracerebroVentricular Dopamine, this treatment allows a dive into the brain to better treat the disease, similar to the continuous administration of insulin in diabetic patients. »

Professor David DEVOS, Lille CHU, Lille University, Lille Neuroscience & Cognition Inserm and co-founder of InBrain Pharma

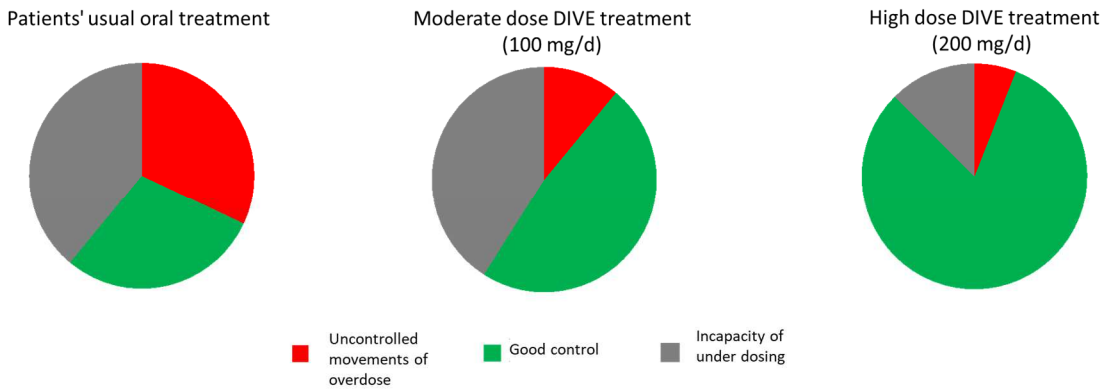
« The anaerobic dopamine solution is produced by the central pharmacy of the Lille University Hospital under the responsibility of Pr Pascal ODOU, according to an original manufacturing process. It is stored in a pump implanted under the skin in the abdominal region to which a fine catheter is connected, allowing the dopamine to be distributed locally in the cerebral ventricles, avoiding peripheral side effects. Our clinical trial conducted by the Lille University Hospital has demonstrated excellent results for our patients in terms of feasibility, safety and clinical effect on disability control. As a healthcare professional, I am pleased to contribute to the emergence of a new therapeutic solution for the people we support.»

Professor Caroline MOREAU, Lille CHU, Lille University, Lille Neuroscience & Cognition Inserm et co-founder of InBrain Pharma

First clinical results confirm better ergonomics than current pump treatments, high safety and a very promising clinical effect.

The clinical trial, currently underway at the Lille University Hospital, involves a comparison of the DIVE solution with conventional treatment of patients (NCT04332276). The results are reported on diaries filled out by patients at home and during their real life over several weeks. **From moderate doses of about 100 mg/24h, a clear reduction in the effects of overdose by more than 50% is observed in favor of a doubling of the ideal control period. With larger doses close to 200 mg/24h, the control of motor fluctuations seems even more important, of the order of 80% of the ideal control period.**

PROMISING CLINICAL EFFECTS



DIVE's concept has the advantage of integrating the pump and delivery system inside the body, which is much more convenient than all other current concepts, including external pumps that require either daily skin pricking with visible catheters or gastrostomy surgery (hole in the stomach with a tube that exits the body). The existing (external) pumps on the market also require daily filling unlike **DIVE which requires filling only every 1-2 weeks.**

DIVE also appears to be less invasive than deep brain stimulation, which is very popular with patients. It is also simpler and less risky. **The first results suggest a major clinical effect concerning these fluctuations of over- and under-dosing and without the risks of deep brain stimulation and better ergonomics than the current pumps.**

« The safety and clinical effect of our treatment seem exceptional. Our symptomatic approach with a very strong scientific rationale gives us confidence in the success of our future phase III clinical trial. It is a great strength of the project and a pride for all the teams involved to improve the lives of patients. »

Dr Matthieu FISICHELLA, CEO & Co-founder of InBrain Pharma.

InBrain Pharma, a start-up from Lille for a faster development of the technology

InBrain Pharma is a biotechnology company developing innovative solutions to solve brain diseases based on the "Brain Infusion" which was created from patented research work conducted by Prof. David DEVOS and Prof. Caroline MOREAU in their academic research team at the University of Lille, Lille Neuroscience & cognition UMR-S 1172 INSERM and the

Lille University Hospital. In 2017, InBrain Pharma was designated winner of the call for proposals from the University of Lille Foundation, which enabled it to obtain initial funding. In 2018, the company InBrain Pharma was created to exploit the technology through a worldwide exclusive license of the patents signed with SATT Nord. That same year, the start-up was also among **the winners of the i-Lab innovation competition**. It also obtained funding through the Plan d'Investissement d'Avenir operated by Bpifrance and the Hauts-de-France region. At the end of 2018, InBrain Pharma raised its **first round of financing for an amount of more than 1 million euros from Finovam and Fira- Nord-Est, both managed by Finovam Gestion, Nord France Amorçage and Business Angels and obtained in 2019 a DEEPTECH grant from BpiFrance.**

InBrain Pharma's Phase I/IIB clinical trial, conducted with the Lille University Hospital, is still underway. The next step for InBrain Pharma's teams is the preparation of a larger Phase III clinical trial to obtain marketing authorization and commercialization of the DIVE treatment.

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