



Start-ups have an incredible capacity to influence the future of this world through the technologies they develop.

Thanks to the start-ups it supports, Erganeo contributes to the delivery of solutions to the major societal and environmental challenges we face. For millennia, technologies have enabled mankind to advance and progress but often at the expense of environmental considerations.

It now falls to us to take up the ambitious challenge of combining social progress with protection not only of the environment but also patient health and wellbeing through the DeepTech companies that support us.

I am sure that together we will find a way of achieving this as human imagination knows no bounds and the future is bold.

This book offers a selection of outstanding examples, one more stone in the construction of this shared goal.

Enjoy your reading!



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tool, MilliDrop is now tackling quick and sees as an utmost priority for public

Yamina GHOMCHI **CEO of MILLIDROP**

Paris, MilliDrop - М

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MilliDrop ushers in breakthrough progress in automating microbiology culture and high-throughput analysis.

Thanks to its millifluidic technology, it miniaturises microbial cultures in thousands of millmetrical drops manipulated simultaneously, each forming a standalone bioreactor.

The company offers an initial instrument, the MilliDrop Analyzer, aimed at research laboratories. The analyser can be used to characterise microbial ecosystems such as root and human microbiota as well as to study pathogenic bacteria.

MilliDrop is drawing on its expertise and technology to develop an In Vitro Diagnostic tool for blood infections, which will speed up the process of microbiological diagnosis for patients with sepsis. The MilliDrop solution will allow professionals

to isolate the infectious bacteria, identify it and determine effective antibiotics for the patient, all within 12 hours. This targeted antibiotherapy tool that works in just 12 hours compared to the current 48 will boost patient survival rates and prevent serious consequences, as well as fighting off the emergence of multidrug-resistant bacteria.



BRAINVECTIS

The pharmaceuticals industry has unsuccessfully ploughed dozens of billions of Euros into finding a treatment for neurodegenerative diseases. The time has come to pick up the pace in developing new approaches and new treatment methods. This is what we set out to achieve at Brainvectis, drawing on a gene therapy approach that can be applied to both single-gene and non-genetic diseases and disorders.

Jérôme Becquart **CEO of BRAINVECTIS**

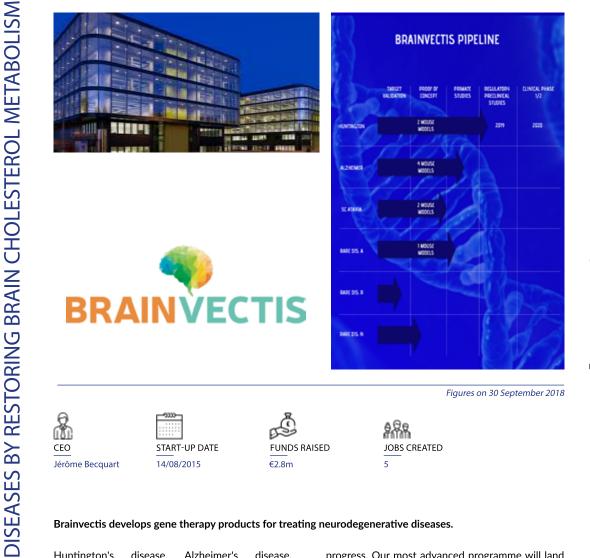
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Brainvectis -

BY RESTORING BRAIN CHOLESTEROL METABOLISM



Brainvectis develops gene therapy products for treating neurodegenerative diseases.

Huntington's disease, Alzheimer's disease, spinocerebellar ataxia: the diseases we tackle are severe, lethal and currently without a treatment solution. Our approach involves restoring disrupted brain cholesterol metabolism in patients suffering from these diseases. The brain's cholesterol metabolism is key to neuron survival and some of their vital functions: Energy metabolism, transporting and eliminating toxic proteins and synaptic transmission.

In total, our approach has been approved in nine neurodegenerative disease models, using AAVtype (Adeno Associated Virus) viral vectors. A single intracranial or intravenous injection is sufficient to sustainably rebalance the brain's cholesterol metabolism with the possibility of potentially altering how these neurodegenerative diseases

progress. Our most advanced programme will land in clinics in 2020, and focuses on Huntington's disease, a rare genetic diseases that affects 60,000 patients in Europe. Brainvectis was set up as a platform for the work conducted by the Inserm team led by Nathalie Cartier, a pioneer in clinical gene therapy for rare central nervous system diseases.

We are based at the Institut du Cerveau et de la Moelle Épinière (ICM, Hôpital Pitié Salpêtrière, Paris) and are accelerating development in our treatments thanks to a dense network of gene therapy (bio-production) and clinical (reference centres) specialist partners.



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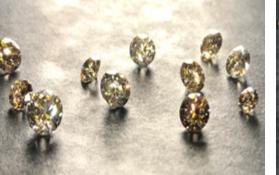
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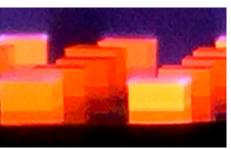
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CEO



DIAM CONCEPT

START-UP DATE



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Diam Concept makes ultra high-grade laboratory diamonds for the jewellery market.

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Over the past decade or so, the jewellery and highend jewellery market has been sourcing lab-grown diamonds, identical to mined diamonds in all ways except one: these are ethical, 100% traceable and eco-responsible, as they aren't sourced from the planet's volcanic regions.

Europe's very first start-up to invest in this area, drawing on a team that was formed at the CNRS and Université Paris 13 laboratory, Diam Concept grows and sells its own diamonds.

Two methods are used to grow diamonds in laboratories: the HPHT (High Pressure - High Temperature) method, in which the diamond is formed at extreme pressure of over 60,000 times the air pressure, and the CVD method (plasmaassisted chemical vapour). Diam Concept uses the second method, which results in a very low carbon footprint. With the plasma method, Diam Concept grows a diamond seed by depositing carbon atoms on a substrate. These atoms are sourced from plasma, made from hydrogen and methane (a natural renewable gas), ignited by microwaves. The carbon atoms produce crystallisation in layers, which allows several ultra high-quality diamonds to form at the same time.

Synthetic diamond production looks set to rise over the next few years. Diamonds are a finite natural resource, and mining them is becoming increasingly complex and harmful for the environment. By growing diamonds in laboratories, Diam Concept is helping to protect natural deposits from depletion, and to restrict complications that stem from diamond mining. Furthermore, synthetic diamonds have incredible qualities that make them ideal for use in a huge array of different sectors (power electronics, quantum computing, medical and thermal imaging, etc.).

ERMIUM THERAPEUTICS

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We aim to develop innovative treatments that help control a number of autoimmune diseases, b taking action prior to inflammatory trigger reactions that become imbalanced in the patients in question.

Joël Crouzet CEO of ERMIUM THERAPEUTICS

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Ermium Therapeutics is a Paris-based biotechnology company that develops innovative healthcare products for autoimmune and inflammatory diseases.

Ermium Therapeutics aims to revolutionise treatment of autoimmune and inflammatory diseases by developing innovative drugs and medication. There is significant medical demand in these diseases.

Ermium raised €6.3m thanks to Kurma Biofund III, Idinvest, Erganeo and an industrial backer, Domain Therapeutics. Ermium Therapeutics will be expanding on the findings to come out of Dr Jean-Philippe Herbeuval's laboratory at the CBMIT (UMR 8601 CNRS and Université Paris 5).

Jean-Philippe Herbeuval and his team members identified an early-stage mechanism that regulates inflammatory responses, notably by blocking type I interferon production, proinflammatory cytokine that plays a key role in this inflammatory response process. The receptor involved in this regulating pathway is CXCR4. This is a G protein-coupled receptor (GPCR) that is known to be a chemokine receptor. The findings demonstrate that chemical structures can be used that have an agonistic effect on inhibiting the type I interferon production pathway, blocking autoimmune and inflammatory diseases ahead of time as a result.

JOBS CREATED

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Figures on 30 November 2019

Ermium will be pursuing research into the CXCR4 agonists, with the aim being to select a developmental lead, to ensure non-clinical development of this lead, and then to conduct a phase I study with the ultimate goal of producing evidence of this concept in patients in phase II. This will lead to an industrial partnership with a pharmaceuticals company that will continue development and will handle marketing for Ermium Therapeutics' first product, providing treatment for patients with autoimmune diseases.

ICON PHOTONICS

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ICON Photonics is positioning itself as a leader in developing the future of ultra high-speed telecommunications, which should very soon hit 400 Gbps and above.

Carlos Vianna CEO of ICON PHOTONICS

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ICON Photonics offers innovative solutions in fibre optic coupling and encapsulation.

ICON Photonics has been a development deep-tech company since 2014. It was officially founded in 2018, based on ground-breaking technology in highperformance fibre optic coupling and encapsulation for ultra high-speed fibre optic telecommunications. The technology was developed by the ESIEE Paris laboratory, with the exclusive license for its international patent assigned to ICON Photonics, a spin-off of the ESIEE.

The fibre optic coupling solution draws on a polymer thin-film structure, built in three dimensions to confine the optical frequency of the optoelectronic component (transmitter - laser or receiver photodiode) towards the fibre, or conversely, from the fibre to the component. This structure couples and guides the light between the component and the fibre in a controlled manner. This innovation from ICON Photonics increases component debit to the power of three, but it also reduces production costs linked to aligning components by around 40%. Furthermore, the solution is incredibly easy to roll out on an industrial scale, and will help develop and expand the use of fibre across all applications (such as data centres), with speeds of up to 400 Gbps (gigabytes per second) and above. ICON Photonics' market is extremely active and booming, with target clients working primarily in the datacom and telecom sectors.

NEURALLYS

philippe.auvray@neurallys.com 13° Paris **NEURALLYS** - FOR NEUROLOGY AND NEUROSURGERY

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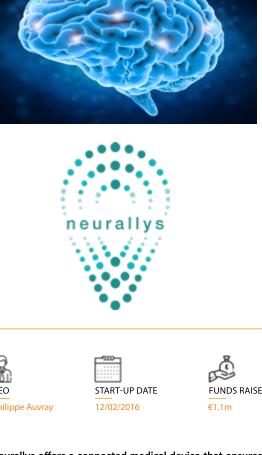
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Neurallys offers a connected medical device that ensures better monitoring and follow-up for patients with hydrocephalus.

Hydrocephalus is a condition that results in abnormal pressure inside the skull, and for which the only existing treatment is a valve system implantation. Hydrocephalus accounts for one surgical procedure every 15 minutes in the United States, and just as many in Europe. Neurallys is developing a pioneering medical device for patients suffering from this condition.

The surgery aims to implant a ventriculoperitoneal (VP) shunt to balance pressure on the brain. In 25% of all cases, the valve system is required to be reassessed, often for malfunctioning or suspected malfunctions linked to valve deregulation, obstruction, infection, or disconnection.

Malfunctions in these shunts are recurring, difficult for doctors to diagnose, and require patients to keep coming back to A&E. No fewer than 40% experience issues in the two years following implantation, and 98% in the 10 years following it. In light of these issues, the medical device developed by Neurallys means patients' brain pressure can be monitored remotely, thus removing the need for them to come to A&E in the event of any symptoms, and as a result improving their quality of life.

The data transmitted electronically to neurosurgeons allows the latter to better monitor their patients, reduces the need for invasive exploratory surgery in the event of suspected malfunctions and facilitates valve system adjustments.

ARGUMENT THEORY

Argument Theory uses artificial intelligence techniques to help with decision-making and if required, automated processes for taking complex decisions. We offer personalised solutions in a variety of different fields such as automated compliance management, medical diagnosis, cyber security, trading, etc.

Prof. Pavlos Moraitis CEO of ARGUMENT THEORY

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Argument Theory offers an innovative platform to help users make complex, difficult decisions in an ever-

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What we do:

Prof. Pavlos Moraitis

changing context or setting.

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CEO

ARGUMENT THEORY gives clients access to its artificial intelligence platform, which draws on computational argumentation to resolve complex and difficult decisions. It provides users with significant decision-making assistance and can potentially go as far as to take fully automated decisions when necessary, in a fully transparent and justified manner. We can quickly and efficiently encode our clients' policy decisions in different areas (for example automated compliance management, automated data access management, trading, automated risk assessment and mitigation) and provide them with the answers they need while justifying the decisions and explaining the data on which they are based. This can help clients deepen how they exploit the results.

START-UP DATE

21/05/2019

Our technology:

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ARGUMENT THEORY is an Artificial Intelligence (AI) SaaS platform. It takes into account the requirements underpinning decision-making issues involving a number of factors (potentially uncertain and changeable factors) that affect the solution in complex and difficult ways, from among a multitude of different options. Our approach is based on computational argumentation, technology that provides an AI system with human-like reasoning capacities and behaviours. In particular, our platform has the ability to assess the arguments for or against a specific decision, and explain the reasons and hypotheses underpinning each decision. In addition, the technology's solutions and systems can be easily adapted in a modular fashion to fit new and changing requirements.

Figures on 30 November 2019

ORIXHA

Today, survival rates for out-of-hospital cardiac arrest are lower than 10%. Orixha's ultra-fast hypothermia solution significantly increases this prognosis

Fabrice PAUBLANT CEO of ORIXHA

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Orixha aims to develop innovative medical devices that meet a high unmet need by drawing on the internationally renowned expertise of its founders in liquid breathing.

Our first application is designed for resuscitation following cardiac arrest.

Following cardiopulmonary resuscitation, ultrafast systemic hypothermia induction gets to work in a matter of minutes via LV4C (Liquid Ventilation for Cooling) technology to protect vital organs (brain, heart, kidneys, etc.) and stop damaging inflammatory responses. Preclinical proof of concept for the effectiveness and safety of our technology was rolled out in a number of physiopathological contexts on large animals of a similar weight to humans. Orixha aims to put its innovative medical device to market for the medical community from 2022 on. Our ten-year plan involves emerging as a renowned industrial leader around the world providing innovative solutions that allow emergency and resuscitation staff to save lives and maintain quality of life for patients.

This plan and vision are underpinned by solid expertise, experience and values.

Orixha's three core values are: Clinical benefits, scientific excellence and operational transparency.

Orixha boasts a host of experience stemming from research into liquid ventilation conducted for over ten years at Sherbrooke university in Québec and within the INSERM U955 unit based at the Ecole Vétérinaire d'Alfort (EnvA) into the benefits of hypothermia on the consequences of acute heart failure.

COGITH



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COGITH is developing an unprecedented treatment for liver cancer via gene/cell therapy and immunotherapy.

Hepatocellular carcinoma (HCC) is a form of cancer that develops from liver cells and:

Represents an unmet urgent medical need Is the fourth leading cause of cancer-related deaths Accounts for 780,000 cases per year globally Accounts for 9,000 cases per year in France Survival rate at five years: 17% Results in palliative treatment outside of surgery for 15% of patients

COGITH is a start-up that is developing an unprecedented HCC treatment process by combining gene/cell therapy and immunotherapy.

Mesenchymal stem cells (MSC) with a patented gene are introduced via intra-arterial injection and a prodrug is administered (cyclophosphamide, CPA).

Proof of concept has been conduced both in vitro and in vivo in two animal models (mice and rabbits). The findings show that tumours are eradicated and metastases prevented.

FACULT DE MÉDECINE

Inserm

Figures on 30 November 2019

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We have a human MSC (mesenchymal stem cells) clone, for which a patent was filed by Erganeo on 15/10/19.

We now need to build up a bank of specific targeted antibodies and conduct the preclinical regulatory studies needed to move on to Phase I/II within three years at the most. Other solid tumour indications will then be trialled.

In terms of development, the company intends to recruit scientific and administrative staff and roll out public and private sector fundraising (~€15m) to reach Phase I/II.

SOLÉO ECOSOLUTIONS

by 2000, the planet will be nome to hime billion humans. In order to feed the global population, farming production will need to be increased by 70%, resulting in the need to control diseases and pests. There are only two solutions to tackling this ssue: more pesticides, or new, sustainable alternatives. We believe in the latter. SUSTAINABLE FUTURE

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CEO

CEO of SOLÉO ECOSOLUTIONS





SoléO-écosolutions





Soléo-écosolutions develops natural moleculebased biocontrol solutions for leaf-cutter insects. Our primary target is leaf-cutter ants, one of the primary pests to wreak havoc on crops in Latin America and the Caribbean.

START-UP DATE

Our industrial process has been greenlighted. We conducted large-scale trials in Guadeloupe in partnership with the CTCS, the FREDON and the département, and the findings show our solution is able to tackle young nests that account for 80% of total nests.

This progress means we are now in a position to reflect on implementing large-scale damage control across Guadeloupe, our pilot market.

We are currently finalising targeted biodegradable packaging for our ant solution, which protects the product from bad weather conditions, which in turn opens up the potential for new sources of income.

Designed to replace traditional pesticides, biocontrol solutions help reduce the risk for human and environmental health.

SoléO-écosolutions has been the Green Tech prize winner since 2016 and won the Concours Innovation prize in 2018.

We set up Open Agora because we believe in collective intelligence. We're convinced it is possible to design digital tools to help foster this intelligence. Today, a plethora of solutions that enable expression exist, but very often artificial intelligence is used to synthesis a collective opinion. We want to put collective spirit at the forefront of the action, by simply enabling dialogue in a world where monologues dominate the field

Christophe Morvan, CEO of OPEN AGORA

OPEN AGORA

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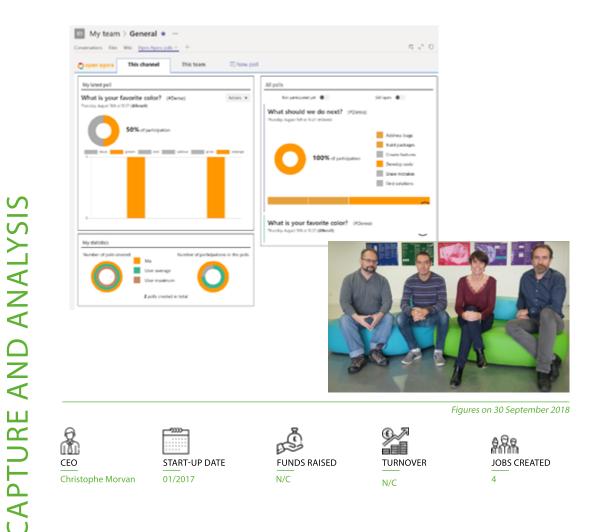
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Open Agora aims to improve collaboration within companies' teams.

Understanding collective opinions, whether those of clients, employees or wider communities, is an essential process for both companies and local authorities.

Open Agora designs and creates a range of software tools aimed at developing and managing online surveys.

We start by finding comprehensive surveying and voting applications that are easy to use and incorporated into Slack and Microsoft Teams (powerful team communication tools used by thousands of companies worldwide). These applications improve collaboration within working teams by facilitating feedback and collective decision-making processes within an existing platform. Open Agora also develops an independent product called Instant Agora, which allows users to quickly create consultations that are accessible to all. These products are used by over 120,000 users, 40% of which are based in the United States. The company also integrates its tools into third-party products or environments upon request.

Open Agora was founded by three partners: Christophe Morvan (CEO), a former computer science teacher and researcher. Benoît Masson (CTO), a former computing researcher (graduate from the École normale supérieure de Lyon) and deputy director of Epitech in Rennes, as well as a web developer. Olivier Bache (CPO), who studied mathematics at the Université de Rennes 1 before specialising in web development at a computer engineering company.

EVERZOM

Jeanne Volatron CEO of EVerZom

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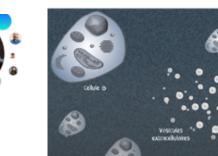
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EVerZom

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CEO



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EVerZom draws on technologies developed at the Laboratoire Matière et Systèmes Complexes at the Université Paris Diderot/CNRS. EVerZom's goal is to create a new industrial platform for 'custom' bioproduction and engineering of extracellular vesicles (EVs).

Extracellular vesicles are intercellular communicators, subcellular entities produced by cells spontaneously or in response to stress. They are comprised of biomolecules such as lipids or proteins from the mother cell. Due to their size (50 to 400 nm), EVs are classified as "biological nanoparticles" with regenerative, proliferative and pro-angiogenic potential. They are less expensive and risky candidates for use as an alternative to cellular therapies and liposomes. The primary barrier to them being used in clinical applications remains production methods: they are expensive and time-consuming with a low yield.

EVerZom's technology involves stimulating cells to induce mass production of EVs by generating turbulent bioreactor flow. Drawing on this process, the start-up can produce ten times more vesicles in ten times less time compared to traditional production methods.

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Figures on 30 November 2019

The goal here is to remove barriers to EVs being produced on an industrial scale, to generate high yields and in accordance with regulatory requirements to meet the needs of academic and industrial stakeholders in the pharmaceutical and veterinary industries, the people developing the biotherapies of the future for regenerative medicine and drug delivery applications.

AUGMENTED ENDOSCOPY

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AXARO: the very first ultra-fast AI-based automated endoscopic video capsule reading platform.

AXARO is an artificial intelligence solution for reading and analysing endoscopic video capsules. Quick and reliable, AXARO offers instant diagnosis designed to save gastroenterologists time.

AXARO generates capsule endoscopy results in under five minutes. It assess quality (comprehensiveness, cleanness) of the exam, selects images that are highly likely to contain lesions, analyses and characterises the nature and pertinence of the detected lesions, and draws up a report. Thanks to AXARO, all that remains for gastroenterologists to do is approve and finalise the report. Correspondents and patients are then issued an instant report.

AXARO draws on a unique learning database that collates millions of healthy and pathological images sourced from video capsule sequences. An exclusive agreement with the APHP means the database will continue to be enriched with additional images, thus further bolstering the Al's performance.

The Saas-based technology allows users to check and analyse these images from any device via a secure user account that gives them access to a protected Saas platform (in line with GDPR and health data host norms). No new software or integration are required, and the working process is accelerated.

The start-up will also offer a comprehensive solution with a new-generation AXARO Green capsule, entirely redesigned and equipped with exclusive new features and functions...



L'AVENIR EST FAIT D'AUDACE

Erganeo is a French investment company that specialises in disruptive innovations that significantly benefit society.

We invest early in the game before start-ups are set up, in three major fields: Biotech, Infotech (telecom, connected objects, big data, AI) and Enertech (new energy, chemistry, materials).

Erganeo aims to accelerate and simplify links between research and industry for the benefit of society.

To do so, we finance and accompany the new generation of French researchers and entrepreneurs on the road to international recognition and success.





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