

## **LIQUID VENTILATION: ORIXHA RAISES 4 MILLION EUROS FROM THE EIC FUND AND BPIFRANCE ON BEHALF OF THE FRENCH GOVERNMENT**

### **TOTAL LIQUID VENTILATION TAKES ANOTHER STEP TOWARDS BECOMING A CLINICAL REALITY**

Lyon and Paris, April 10, 2024 - Orixha announces that it has raised 4 million euros from the European Innovation Council Fund and the French Tech Seed fund, managed on behalf of the French government France 2030 initiative by Bpifrance. This financing will enable Orixha to develop and validate in the clinic its total liquid ventilation technology, starting with resuscitated cardiac arrest patients in critical care.



### **Liquid Ventilation: Dreams, Disillusions and New Clinical Hopes**

James Cameron brought the idea of breathing a liquid to the big screen in his film *Abyss* back in 1989, based on scientific work carried out by Pr. Thomas Shaffer's team. They had demonstrated that a liquid - perflubron - was 40 times more soluble in oxygen than water, enabling mammals to breathe it without drowning. The dream of liquid ventilation was born, opening clinical perspectives as an alternative to traditional mechanical gas ventilation.

In the 1990s, an American company initiated by a French researcher, Pr Jean Riess, develops an experimental partial liquid ventilation solution combining the use of a gaseous ventilator with static instillation of perflubron into the lungs. Following an initial clinical proof of concept, an international transatlantic clinical trial is launched to treat acute respiratory distress syndrome. Unfortunately, the results were disappointing: the rudimentary technology did not allow precise control of fluid volume and pressure in patients' lungs.

Learning from the inherent limitations of partial liquid ventilation, the co-founders of Orixha work on a new liquid ventilation technology, called "total" and not "partial" liquid ventilation. Here, oxygen is loaded into the breathable liquid using a dedicated machine, called a liquid ventilator, and the patient is ventilated solely with this oxygenated liquid.

The development of these first medical liquid ventilators is the fruit of a collaboration between the Inolivent team led by Prof. Philippe Micheau at the University of Sherbrooke, and the INSERM team led by Prof. Renaud Tissier at the Ecole Nationale Vétérinaire d'Alfort, with, since 2019, the involvement of the Orixha team. This transatlantic public-private effort led to the development and patenting of a total liquid ventilation technology called LuncoLive, the foundation of Orixha's future medical devices.

LuncoLive's first clinical application is the management of patients resuscitated after cardiac arrest using hypothermic liquid ventilation. Today, two of thirds of the 200,000 patients resuscitated from cardiac arrest



every year in Europe and North America, succumb from Post Cardiac Arrest Syndrome within a few days. For some survivors, neurological sequelae can be seriously debilitating. The Vent2Cool ultra-rapid hypothermia solution should reduce mortality and neurological sequelae for these patients. It will be validated in an initial clinical trial scheduled to start this year.

*"Thanks to our LuncoLive lung protective total liquid ventilation technology, implemented in Vent2Cool, we will finally be able to meet expectations for safe, effective ventilation with a breathable liquid. LuncoLive will enable patients to benefit from the unique properties of this liquid, which are extremely interesting for therapeutic hypothermia and respiratory distress"* **insists Mathieu Nadeau, co-founder and Chief Technology Officer of Orixha, who designed the first academic prototypes, more than ten years ago.**

## **Becoming the world leader in liquid ventilation**

Orixha is a DeepTech company, dedicated to the clinical and industrial development of total liquid ventilation medical devices. With a proof of concept and unique know-how, Orixha is now focusing on the clinical validation of LuncoLive technology and the regulatory and industrial development of its first medical device - Vent2Cool, with a view to commercialization by 2028.

This 5-year effort requires a strengthening of equity capital to the tune of around €20 million. A first tranche of €4 million has just been subscribed by the EIC Fund managed by the European Investment Bank on behalf of the European Innovation Council, Bpifrance's French Tech Seeds fund that is managed by Bpifrance on behalf of the French government France 2030 initiative and Orixha's historical shareholders.

*"The entry of the European Investment Bank and Bpifrance into Orixha's capital is a key step towards our goal of establishing liquid ventilation as a new reference clinical platform in Critical Care by 2030. This €4 million investment will enable us to carry out the first clinical validation of the safety and performance of our liquid ventilation technology, and to validate our industrial strategy,"* **explains F. Paublant, Chairman and CEO of Orixha.**

The investment by the EIC Fund follows on from the EIC Accelerator's selection of the LuncoLive project at the end of 2022. **Svetoslava Georgieva, Chairman of the Board of Directors of the EIC Fund, commented:** *"We are delighted to participate in this round of financing for Orixha, and to be associated with its ambition to become the world leader in liquid ventilation. In doing so, we are supporting a breakthrough technology which, once approved by the health authorities, will save many lives, and which attests to the vitality of medical innovation in Europe".*

For Bpifrance, the investment in Orixha reflects a commitment to supporting DeepTech companies, which had already materialized in the form of grants awarded to Orixha, laureate of the i-Lab and i-Nov competitions. *« We are delighted to be supporting Fabrice Paublant, an experienced entrepreneur, and his team, in a field where medical needs are very significant, and where there are few innovations. »* **explains Marielle Mailhes, Investment Director at Bpifrance.**

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## À propos de Bpifrance et du fonds French Tech Seed :

Bpifrance finance les entreprises – à chaque étape de leur développement – en crédit, en garantie et en fonds propres. Bpifrance les accompagne dans leurs projets d'innovation et à l'international. Bpifrance assure aussi leur activité export à travers une large gamme de produits. Conseil, université, mise en réseau et programme d'accélération à destination des start-ups, des PME et des ETI font également partie de l'offre proposée aux entrepreneurs.

Grâce à Bpifrance et ses 50 implantations régionales, les entrepreneurs bénéficient d'un interlocuteur proche, unique et efficace pour les accompagner à faire face à leurs défis.

Doté de 500 millions d'euros, le Fonds French Tech Seed vise à soutenir les levées de fonds des start-up et des TPE innovantes de moins de 3 ans portant une innovation à forte intensité technologique. Issu du Programme d'investissements d'avenir (PIA), désormais intégré à France 2030 et opéré pour le compte de l'Etat par Bpifrance, le fonds repose sur des apporteurs d'affaires labellisés, chargés d'identifier et de qualifier ces jeunes pousses et de les mettre en relation avec des investisseurs privés. Ces apporteurs d'affaires, garants de la validité technologique du projet, permettront un investissement public, sous forme d'Obligations Convertibles jusqu'à 400 millions d'euros, en complément des capitaux apportés par les investisseurs privés. 100 millions d'euros sont de plus consacrés aux investissements en fonds propres en sus de la conversion des Obligations Convertibles.

Plus d'informations sur : [www.Bpifrance.fr](http://www.Bpifrance.fr) - <https://presse.bpifrance.fr/> - Suivez-nous sur X (Ancien Twitter) : @Bpifrance - @BpifrancePresse

## À propos d'Orixha

Orixha est une société DeepTech dont la mission est de devenir le leader mondial de la Ventilation Liquidienne en démontrant ses bénéfices cliniques pour sauver la vie de patients en Soins Critiques.

Orixha développe le dispositif médical Vent2Cool pour protéger de façon quasi-immédiate les organes vitaux, notamment le cerveau et le cœur, des patients réanimés post arrêt cardiaque et ainsi réduire significativement la mortalité et la morbidité. Vent2Cool transforme les poumons en échangeur thermique avec le compartiment sanguin. Ceci permet d'induire une hypothermie thérapeutique ultra-rapide, de l'ordre de quelques minutes, là où les solutions actuelles d'hypothermie mettent des heures avant d'atteindre la température cible de 33°C.

La technologie propriétaire d'Orixha de LuncoLive acronyme de « Lung Conservative Liquid Ventilation », une fois validée dans l'hypothermie thérapeutique, sera développée pour d'autres conditions en Soins Critiques, notamment le Syndrome de Détresse Respiratoire Aigüe.

Jeune Entreprise Universitaire spin-off de l'Ecole Nationale Vétérinaire d'Alfort, l'Université de Sherbrooke et l'INSERM, Orixha est lauréat des concours i-LAB 2019 et i-NOV 2020. La société a bénéficié du soutien de la SATT Erganeo, WILCO, Agoranov, Bpifrance, EIT Health et de l'European Innovation Council (EIC Accelerator).



## À propos de l'EIC Fund

L'EIC Fund mis en place par la Commission européenne est un fonds agnostique en ce sens qu'il peut investir dans tous les secteurs technologiques, ainsi que dans tous les pays de l'UE et dans tous les pays associés à Horizon Europe. Il fournit à des PME innovantes la composante d'investissement du financement mixte grant+equity de l'EIC Accelerator.

L'EIC Fund vise à combler un déficit critique de financement en Europe et son principal objectif est de soutenir les entreprises dans le développement et la commercialisation de technologies révolutionnaires, en mettant en contact les acteurs du marché, y compris en attirant des investisseurs privés. Son intervention permet de partager davantage, et donc de réduire, les risques en établissant un grand réseau de fournisseurs de capital et de partenaires stratégiques qui soit adapté aux co-investissements à court terme et aux financements ultérieurs.

Le Fonds accorde une attention particulière au soutien qu'il fournit aux fondatrices d'entreprises innovantes, ainsi qu'à l'objectif de réduire l'écart d'innovation entre les pays membres de l'Union européenne.

## About Bpifrance and the French Tech Seed fund

Bpifrance finances companies - at every stage of their development - with credit, guarantees and equity capital. Bpifrance supports them in their innovation and international projects. Bpifrance also supports their export activities through a wide range of products. Consulting, universities, networking and acceleration programs for start-ups, SMEs and ETIs are also part of the services offered to entrepreneurs.

Thanks to Bpifrance and its 50 regional offices, entrepreneurs benefit from a single, close and efficient contact to help them meet their challenges.

The 500-million-euro French Tech Seed Fund is designed to help innovative start-ups and VSEs less than 3 years old with technology-intensive innovations raise capital. A product of the Future Investment Program (PIA), now part of France 2030 and operated on behalf of the French government by Bpifrance, the fund relies on accredited business introducers to identify and qualify these start-ups and put them in touch with private investors. These business introducers, who guarantee the technological validity of the project, will enable public investment, in the form of Convertible Bonds of up to 400 million euros, to complement the capital provided by private investors. A further 100 million euros are earmarked for equity investment in addition to the conversion of Convertible Bonds.

## About Orixha

Orixha is a DeepTech company whose mission is to become the world leader in Liquid Venting by demonstrating its life-saving clinical benefits for Critical Care patients.

Orixha is developing the Vent2Cool medical device to provide near-immediate protection for vital organs, particularly the brain and heart, in post-cardiac arrest resuscitation patients, thereby significantly reducing mortality and morbidity. Vent2Cool transforms the lungs into a heat exchanger with the blood compartment. This enables ultra-



rapid therapeutic hypothermia to be induced, in the order of minutes, whereas current hypothermia solutions take hours to reach the target temperature of 33°C.

Orixha's proprietary LuncoLive for "Lung Conservative Liquid Ventilation" technology, once validated in therapeutic hypothermia, will be developed for other Critical Care conditions, including Acute Respiratory Distress Syndrome.

Young University compagnie spin-off from the Ecole Nationale Vétérinaire d'Alfort, the University of Sherbrooke and INSERM, Orixha is a winner of the i-LAB 2019 and i-NOV 2020 competitions. The company has received support from SATT Erganeo, WILCO, Agoranov, Bpifrance, EIT Health and the European Innovation Council (EIC Accelerator).

## About the EIC fund

The European Innovation Council Fund from the European Commission is an agnostic Fund: it invests across all technologies and verticals, and all EU countries and countries associated to Horizon Europe. It provides the investment component of the EIC Accelerator blended finance. The European Investment Bank acts as investment adviser to the EIC Fund.

The EIC Fund aims to fill a critical financing gap and its main purpose is to support companies in the development and commercialization of disruptive technologies, bridging with and crowding in market players, and further sharing risk by building a large network of capital providers and strategic partners suitable for co-investments and follow-on funding.

The Fund pays particular attention to the empowerment and support of female founders as well as the ambition to reduce the innovation divide among EU countries.