



Press Release

Hemarina helps to heal injuries in reconstructive surgery with HEMO₂life[®] oxygen carrier

During his visit to France's Percy Army Training Hospital on 28 April 2022, The French President met several soldiers who had been seriously injured in foreign interventions. One patient injured during a foreign military operation successfully underwent a face transplant, made possible by the HEMO₂life[®] medical device developed by HEMARINA

Morlaix, Paris, 5th May 2022 – Hemarina announced today that its universal oxygen carrier derived from a sea worm, HEMO₂life[®], was recently used in a procedure for a French soldier injured in a foreign military operation and subsequently visited by the French President during an official visit to military personnel injured in foreign military operations, as well as over 300 kidney transplants. The remarkable oxygenation properties of HEMO₂life[®] make this medical device particularly suited not only for kidney transplants but also for major reconstructive surgery or complex transplants (composite tissue transplantations).

HEMO₂life[®] actively contributes to treatment of injured patients. Since its collaboration with the US Navy on a preclinical model for cerebral trauma treatment, Hemarina's technology was successfully used last year in a bilateral upper limb transplant at Amrita Medical Sciences Institute in Kochi, India. The most recent use was for a young French soldier visited by the French President on 28th April 2022 at Percy Army Training Hospital. The soldier was seriously injured during a foreign military operation and required major reconstructive where Pr. Laurent Lantieri's team used HEMO₂life[®] to ensure oxygenation and proper tissue preservation and allow for successful re-implantation.

"The teams from Georges-Pompidou European Hospital and Percy Army Training Hospital were able to carry out this major facial reconstruction surgery and provide a new lease-on-life for this young, seriously injured soldier. He wishes to remain anonymous to rebuild his life after the medical success of the procedure. Thanks to the quality of oxygenation provided, HEMO₂life[®] made tissue recovery of the grafts easier" explained Professor Laurent Lantieri, Head of Reconstructive Surgery at Georges-Pompidou European Hospital (AP-HP). He adds "the value of this universal oxygen carrier molecule is evident for multiple trauma and violent injuries requiring major reconstructive surgery such as facial or major organ transplants, to improve tissue preservation for both transplantations and re-implantations. Patients injured on the battlefield are frequently far from rear-base hospitals which could provide advanced reconstructive microsurgery techniques. One also wonders about future potential use as blood substitute for new medical applications."

"We are extremely proud that our technology made more than 300 procedures possible. This means just as many improvements for families and patients alike. All of these procedures together with post-operative analyses confirm the potential of HEMO₂life[®], which combines the M101 oxygen carrier molecule derived from marine life, a molecule allowing physiological transport of oxygen and its release without oxidative damage" concluded Dr. Franck Zal,

founder and CEO of Hemarina, adding “Using HEMO₂life[®] in major reconstructive surgical procedures on composite tissues (face, limbs...) also proves the value of M101 in this type of graft as well as in organ transplants.”

The value of the HEMO₂life[®] technology and its potential for major reconstructive surgery procedures and difficult grafts was demonstrated in the 2020 Lancet¹ publication recounting the first re-transplantation carried out by Pr. Laurent Lantieri, Department of Plastic, Reconstructive and Aesthetic Surgery at Georges-Pompidou European Hospital in 2018. In this publication, Pr. Lantieri identified HEMO₂life[®] as a product of interest for its capacity to solve many problems encountered during particularly complex surgeries amplified by the fact that they require much more time and consequently much more oxygen during transplants.

HEMO₂life[®] is composed of extracellular hemoglobin extracted from a sea worm (*Arenicola marina*) discovered via a biometric approach. In fact, this sea worm carries the ancestor of human hemoglobin, absent from red blood cells 450 million years ago when this creature first appeared on Earth. The worm is capable of surviving at least 6 hours without breathing thanks to its hemoglobin, which stores oxygen at high tide. During its evolution, the worm adapted to the phenomenon of tides; the cycle of high/low tides is nature’s equivalent to ischemia/reperfusion in medicine. An organ separated from its donor is no longer oxygenated, like the arenicola at low tide which must live from stored oxygen. Subjecting a graft to oxygen-rich arenicola hemoglobin means the graft has sufficient physiological oxygen to stay alive even after being separated and the slow release of oxygen avoids oxidative damage. This universal oxygen carrier results from several years of research by the Brittany-based company Hemarina and is the first product clinically efficient in preventing ischemia/reperfusion issues in organ transplants.

About Hemarina

Hemarina was founded in 2007 and headquartered in Morlaix (France). The company specializes in the development of universal therapeutic oxygen carriers derived from marine invertebrates. Hemarina has a technical & commercial affiliate in Boston (Hemarina Inc.) and a production subsidiary for its raw materials on the island of Noirmoutie. Hemarina is developing several breakthrough innovative medical devices using its hemoglobin M101 platform.

For more information, visit the website: <https://www.hemarina.com/>

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^{1 1} First human facial retransplantation: 30-month follow-up
Lantieri et al.

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