

APRIL - 2020  
ISSN 2644-2787

# pharma

**TECH OUTLOOK**

EUROPE EDITION  
[WWW.PHARMATECHOUTLOOK.COM](http://WWW.PHARMATECHOUTLOOK.COM)



## Vect-Horus



*The annual listing of 10 companies that are at the forefront  
of providing Drug Discovery and Development solutions  
and transforming businesses*

# Vect-Horus

## Innovation to 'Bypass' the Barriers



Alexandre Tokay

**T**he human brain has always been perceived as the most complicated and mysterious thing in the universe, perhaps not only because of its psychological functions but also physiological components. Besides neurologists, pharmacists are the ones who experience and cope with these complexities day in day out. As a consequence of the growing aging population, many neurodegenerative diseases, such as stroke, Alzheimer's disease, and Parkinson's disease as well as cancer, are becoming more prevalent. As a result, pharmaceutical companies are under increasing pressure to produce novel and effective drugs. However, their path to successful drug delivery is paved with multiple challenges. For

one, getting therapeutic agents to the nervous tissue of the CNS has been a long-unsolved industry predicament due to a unique vascular system called the blood-brain barrier (BBB) that prevents over 98 percent of all small-molecule drugs, and close to 100 percent of large-molecule drugs, from passing from blood, across the blood vessels into the nervous tissue. This leads to low efficacy and high attrition rates for drug developers.

Added to this, Pharma companies also struggle with improving therapeutic or diagnostic benefits while minimising both dose-levels and side-effects of newly developed molecules. These can be achieved by enhancing the targeted delivery of drugs or imaging agents to tissues of interest and thus limiting

their off-target effects. This is where Vect-Horus is in a class by itself.

When it comes to the development of novel molecules targeting neurodegenerative diseases, Vect-Horus is moving the needle and ‘bypassing the barriers’ with an innovative targeting technology. Rising to the aforementioned challenges, Vect-Horus has devised an innovative technology— VECTrans®—to empower pharmaceutical and biotech partners to transport their drugs into organs, and enhance the delivery of drugs or imaging agents into the CNS and to other tissues such as tumours. This has proved instrumental in bringing down the high attrition rate for CNS compounds and enabling the use of minimal drug doses with maximal treatment efficacy. Vect-Horus has developed various vectors that target specific receptors expressed at the level of the BBB or by cancer cells. Once the vector molecule is locked onto the appropriate receptor, the vector-drug conjugate is internalised and in the case of the BBB, undergoes transcellular trafficking. This strategy of delivery is called receptor mediated transport (RMT), which is believed to be the most effective and safest physiological pathway for the transport of endogenous substances into and across cells.


Though there are a few companies in the US and Canada adopting the same approach in enhancing drug delivery, Vect-Horus’ technology is unmatched and unique, in and of itself. Compared to its competitors, Vect-Horus targets different well-defined receptors. It also offers the greatest flexibility with a set of vectors that allow a case-by-case adaptation to different classes of drugs and imaging agents. Alexandre Tokay, co-founder and president, Vect-Horus, says, “Our company puts a massive effort in identifying receptors that are specific of the BBB, and also of the BBB that has been damaged by neurological diseases.” Unlike its competitors, Vect-Horus’ vectors are not derived from natural ligands of receptor targets. VECTrans® selects and optimises only those vectors that do not compete with the natural ligands. This process allows the target receptors to perform their physiological roles effectively. Besides, the vectors developed by the company bind both non-human (rodent) and human receptors, to ensure efficient translation into the clinics. The uniqueness of VECTrans® also stems from the highly versatile nature of its vectors, which makes them available for a wide range of therapeutics, indicated for the treatment of different disease indications.

Having more number of vectors than its competitors has enabled Vect-Horus to get into numerous collaborative initiatives and apply for several patents. In fact, Vect-Horus’ business model is based on various research collaborations and licensing agreements with industrial partners, for transporting their therapeutic drugs to the brain and other organs. The company has demonstrated the in-vivo proof of concept of its VECTrans® technology for various drugs like siRNAs, in animal models. Currently, the company is a part of more than 10 different Pharma/Biotech R&D collaborations for

CNS and cancer indications. In these collaborations, Vect-Horus is evaluating a variety of therapeutic agents, including small molecules, proteins, antibodies, nanoparticles, which are unable to cross the BBB effectively or to get to the cancer tissue.

The company is also developing various conjugated drugs by combining its vectors with molecules that are free of rights (for example, DOTA) and co-developing its patented products with more prominent market players to out-license the drugs at an early phase. For instance, Vect-Horus has recently initiated a collaboration with RadioMedix for the co-development of a theragnostic agent for the diagnostic

and radiotherapy of Glioblastoma Multiforme (GBM) (brain cancer). This agent comprises the peptide vector that targets the LDL receptor coupled to a chelating agent that will encompass radio-nuclides for imaging or for radiotherapy. “This co-development project is fully aligned with our strategy to expand the use of our technology in cancer indications that have highly unmet medical needs,” explains Tokay. “Since we have limited resources and our partner has the know-how in developing radiopharmaceuticals and bringing them to the market, we have incorporated this business model.”

Currently, Vect-Horus is securing its technology platform and products with an aggressive intellectual property policy and has already developed a strong patent portfolio with six patent families covering its vectors, conjugates and drug or theragnostic products. Moving ahead, the company will leverage the revenues earned through developing and commercialising the conjugate to devise and optimise its technology, and fuel its pipeline. Vect-Horus has raised more than €30 million from several investors across different rounds of investment, including public funding from the French government to continue with its path-breaking R&D efforts. 



## **Our company puts a massive effort in identifying receptors specific of the BBB, and also the BBB that has been damaged by neurological diseases**