GeNeuro SA

Leading a paradigm shift in therapeutic approaches to neurological disorders and autoimmune diseases by neutralizing pathogenic factors encoded by HERVs (Human Endogenous Retroviruses)

www.geneuro.com

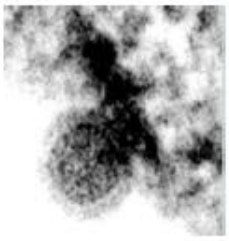
GeNeuro SA		Founded in:	2006
3, Chemin du Pré-Fleuri		CEO:	Jesús Martin-Garcia
1228 Plan-les-Quates		No. of employees:	30
Geneva		Type of Ownership:	Public
SWITZERLAND		Stock exchange:	GNRO (EN Paris)

June 2017: By leveraging expertise it has built up over decades in the HERV medical research and development, GeNeuro is engaging in unprecedented therapeutic development targeting HERVs.
Venture Valuation (VV) interviewed Jesús Martin-Garcia, co-founder and CEO.

VV: **What are HERVs? How were they identified as a therapeutic target?**

Martin-Garcia: HERVs are viral genes integrated in human DNA during evolution over millions of years. They represent approximately 8% of the human DNA, and 26 families of HERVs have been discovered to date.

Dr. Hervé Perron, our co-founder and Chief Scientific Officer, is the first person who identified in the late 1980s MS (Multiple Sclerosis) associated retrovirus, of the type W family (HERV-W) from patients with progressive MS. (see right image)



Isolation of retrovirus from patients with multiple sclerosis. Perron H. et al., Lancet, 1991

HERV-W envelope protein, named MSRV-Env, has been observed to play a central pathogenic role in MS in an increasing number of scientific papers. Also HERV-W activation and its pathogenic envelope protein production are suspected to be a common pathway in other different neurological disorders and autoimmune diseases such as type 1 diabetes, CIDP (chronic inflammatory demyelinating polyneuropathy), and inflammatory psychosis.

GeNeuro has developed a humanized monoclonal antibody, GNbAC1, which neutralizes the pathogenic HERV-W protein. This is the product of several decades of our research activities along with the Institut Mérieux

and INSERM[1] from whom GeNeuro in-licensed the background technology.

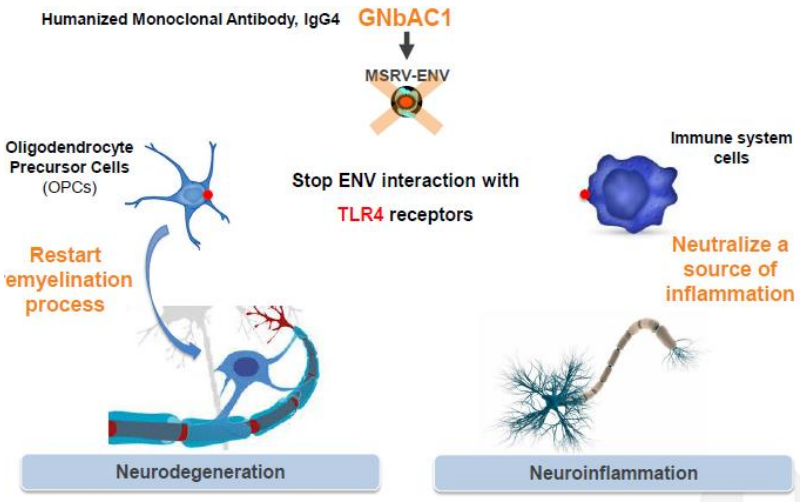
VV: **What is the difference between your therapeutic approach and the currently available treatments for MS?**

Martin-Garcia: Our approach is to treat MS by blocking upstream inflammatory and neurodegenerative mechanisms, whereas the currently applied approach is focused on interfering with the body's immune response.

Three main subgroups of MS are relapsing-remitting MS (RRMS), secondary progressive MS (SPMS) which comes after RRMS in many cases, and primary progressive MS (PPMS). RRMS is characterized by attacks and remissions, while SPMS and PPMS are characterized by the progression of the neurological symptoms and disability without attacks.

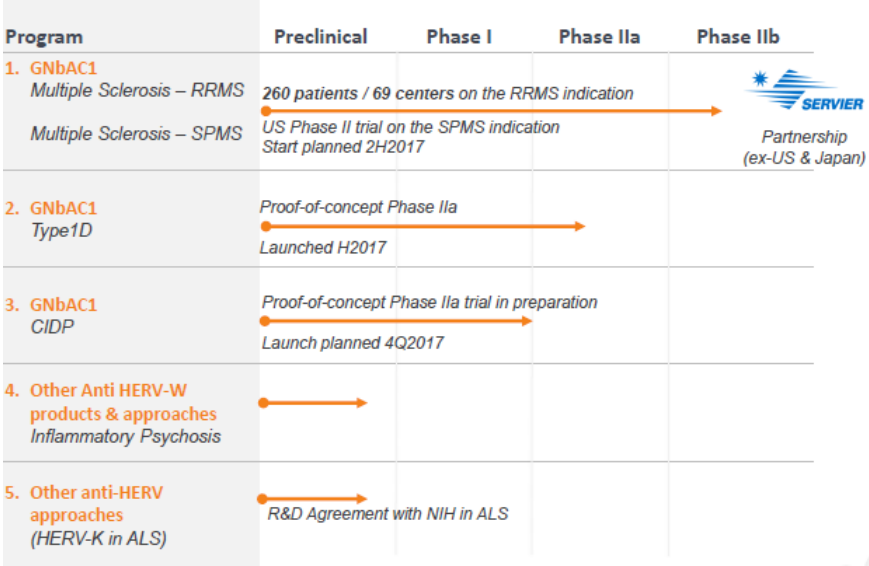
None of currently available drugs are proven to prevent progressive forms of MS which affect around 35% of patients. They are mostly approved for RRMS, which affect 60% of patients, and work by altering or suppressing parts of the patient's immune system. They reduce the number of inflammatory relapses with RRMS, but can cause undesirable side-effects because of the way they affect the immune system.

GNbAC1 aims to be a safe and effective treatment in slowing or stopping the disease's progress without targeting the patient's immune system while also restarting emyelination. Our approach may have a therapeutic effect on both RRMS and progressive forms of MS.



[1] French National Institute of Health and Medical Research

VV: **In your pipeline, your flagship product, GNbAC1 for MS, is currently in Phase IIb, followed by the GNbAC1 for type 1 diabetes in Phase IIa.**



Martin-Garcia: The results of the Phase IIb clinical trial of GNbAC1's efficacy in over 260 RRMS patients in Europe are expected to be announced in October this year. Under the licensing agreement with Servier, a major privately owned French pharmaceutical company, we have retained full rights for the MS markets in the U.S. and Japan. They are approximately two thirds of the global MS market which amounts to over $20 billion per year. In the U.S., we are planning to launch a clinical trial on progressive forms of MS by the end of this year.

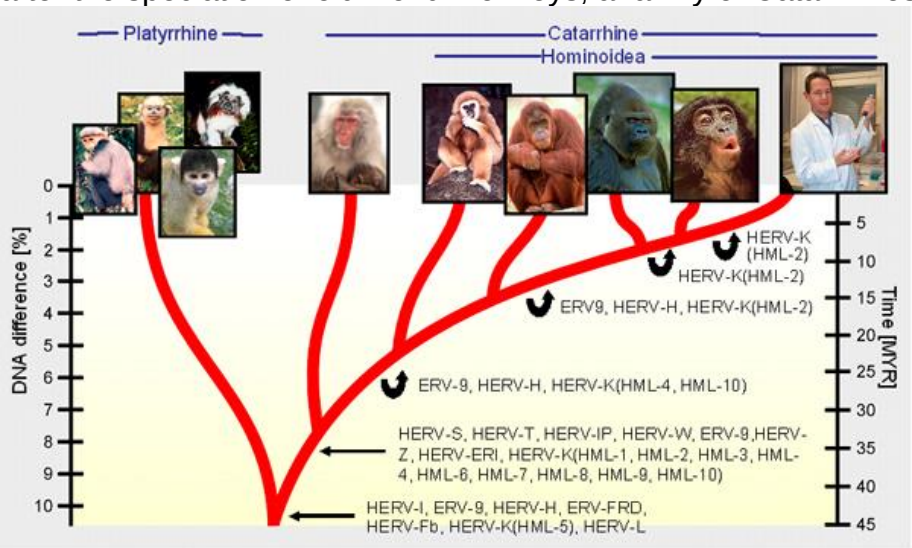
For type 1 diabetes, the GNbAC1's second indication, a Phase IIa clinical trial has been launched in Australia. Australia has one of the highest incidences of type 1 diabetes per capita in the world. The results are expected in 2018.

We are also developing a platform to provide therapeutic options for other indications associated with HERV-W such as CIDP (chronic inflammatory demyelinating polyneuropathy) and inflammatory psychosis. We are also expanding our research on HERV-K, another HERV family member of which proteins are expressed in the brains of ALS (amyotrophic lateral sclerosis) patients. Recently we entered into a research partnership with the U.S. National Institutes of Health to develop novel therapeutic molecules against ALS.

VV Comments after the interview:

HERVs have not been well understood until recently, and regarded as "junk DNA" in the human genome for long time. According to the

Institute of Virology, Helmholtz Zentrum München[2], "HERVs are remnants of ancient germ line infections with exogenous retroviruses that have been genetically fixed and vertically transmitted since millions of years." It seems that they were integrated and expanded in Primates after the speciation of old world monkeys, a family of Catarrhines.



In May 2015, the first international workshop on HERVs and disease was held in Lyon, France. Scientific and medical experts from all over the world discussed topics on the involvement of HERVs in various pathologies such as neurological diseases, virus interplay with pathogeny, neuropsychiatric diseases, diabetes, and cancer.

At the second international workshop in Washington, DC, USA in March this year, Dr. Hervé Perron, as a member of organizing committee, remarked that "Momentum in HERV medical research as well as therapeutic development is now building rapidly."[3]

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[2] https://www.helmholtz-muenchen.de/viro/research/working-groups/retroviral-persistence-in-humans/human-endogenous-retroviruses/research-topics/index.html
[3] https://www.geneuro.com/data/news/geneuro-pr-herv-disease-en-final-28032017.pdf