September 10, 2023

PRESS RELEASE

A major scientific publication

Development of an onco-therapeutic vaccine candidate against human papillomavirus (HPV)-induced cancers, based on preclinical results showing 100% efficacy

The Biotech TheraVectys, in collaboration with Institut Pasteur-TheraVectys Joint Laboratory, has just demonstrated the preclinical efficacy of its "Lenti-HPV-07" lentiviral vector-based vaccine candidate, administered intramuscularly, against cervical and oropharyngeal cancers induced by human papillomavirus (HPV). These results were published in ***EMBO Molecular Medicine*** journal on September 7, 2023, in an article entitled "***Full eradication of pre-clinical human papilloma virus-induced tumors by a lentiviral vaccine***":

https://www.embopress.org/doi/full/10.15252/emmm.202317723

*« **Our vaccine candidate induces a 100% tumor eradication in our preclinical model and a long-term memory immune response that prevents the risk of tumor relapse. This technological advance enables us to expect a major clinical benefit in the treatment of HPV cancer, and offers very promising prospects for other tumor indications. These results are far superior to those obtained in the same pre-clinical model by other vaccine technologies, notably mRNA**». Pierre Charneau, CSO of TheraVectys.*

HPV causes almost all cervical cancers, as well as many oropharyngeal and anogenital cancers. The currently available HPV vaccines essentially induce HPV-neutralizing antibodies, and thus prevent infection, but have no effect on established tumors.

Using the non-integrative lentiviral vector vaccine platform, the Institut Pasteur-TheraVectys Joint Laboratory has developed an onco-therapeutic HPV vaccine candidate capable of inducing strong cellular responses against the "Early" E6 and E7 antigens of HPV16 and HPV18. Its efficacy in the preclinical animal model has led TheraVectys to set up a Phase I/II clinical trial in humans, to be conducted in early 2024 at the Moffitt Cancer Institute in Florida, USA, on patients with cervical or oropharyngeal cancers.

A single intramuscular administration of Lenti-HPV-07 to mice bearing small, medium or large HPV-induced tumors triggers a long-term effector and memory cellular immune response, notably based on

anti-tumor cytotoxic $CD8^+$ T cells, accompanied by profound modulation of the tumor microenvironment, **total tumor eradication and complete elimination of metastases in 100% of animals. Importantly, a single administration of Lenti-HPV-07 also prevents long-term tumor relapse.**

On the other hand, in a recent study, the immunotherapeutic potential of mRNA technology could only be demonstrated against very small HPV-induced tumors, with early relapse in almost 50% of treated animals (Ramos da Silva *et al*, 2023). **Conversely, in the preclinical study conducted by the Institut Pasteur - TheraVectys Joint Laboratory, Lenti-HPV-07 immune therapy was active on large tumors, which are notoriously more difficult to control, demonstrating the far superior efficacy of this vaccine platform.**

In addition, Lenti-HPV-07 oncotherapy can act synergistically with other immunotherapies, such as treatments with immune checkpoint inhibitors like anti-PD1 (Programmed cell Death protein-1) antibodies. Therefore, Lenti-HPV-07 therapy is emerging as a promising immuno-oncotherapy for HPV-induced tumors.

About TheraVectys

Biotech TheraVectys, which specializes in immunotherapy, reflects more than 20 years of research into lentiviral vectors, and brings an innovative technology to the field of vaccinology.
Research is conducted under the scientific direction of **Pierre CHARNEAU**, inventor and pioneer of lentiviral technology (for which he received a prize from the Académie des Sciences in 2004) and **Laleh MAJLESSI**, Research Director in Immunology, at the Institut Pasteur-TheraVectys Joint Laboratory.
Christian BRECHOT, the former Director General of Institut Pasteur and INSERM, is the Medical Director of TheraVectys.
The biotech's work is based on a proprietary platform to deliver T-cell vaccines in response to critical unmet medical needs.
TheraVectys' technology and its worldwide license area have a huge number of applications in infectious diseases, cancers and viral cancers, and are driving a revolution in prophylactic and therapeutic vaccination.

Our goal: To profoundly improve global health.

Our approach: Strategic industrial partnerships to take our vaccine candidates from proof-of-concept to clinical trials and commercialization.

About Institut Pasteur

Created by decree in 1887 on the initiative of Louis Pasteur, Institut Pasteur is a world-renowned biomedical research center. To carry out its mission of fighting disease, in France and worldwide, Institut Pasteur is developing its activities in four areas: research, public health, training and the development of research applications. A recognized world leader in infectious diseases, microbiology and immunology, Institut Pasteur is dedicated to the study of the biology of live organisms. Its work focuses on emerging infectious diseases, antimicrobial resistance, certain cancers, neurodegenerative diseases and brain connectivity pathologies. To reinforce the excellence of its research, Institut Pasteur has developed a state-of-the-art technological environment, including nano-imaging, computational biology and artificial intelligence. Since its creation, 10 researchers working at Institut Pasteur have been awarded the Nobel Prize in Medicine, the most recent in 2008 in recognition of their 1983 discovery of the human immunodeficiency virus (HIV) responsible for AIDS. Institut Pasteur is a member of Pasteur Network, a global network of more than 30 members on five continents, united by shared Pasteurian values, which contribute to the improvement of human health. Since July 1, 2021, Institut Pasteur has been a partner research organization of Université Paris Cité.

Contact Médias TheraVectys
Anna Véronique EL BAZE – 06 03 03 29 26
avelbaze@kbzcorporate.com

TheraVectys S.A.
28 rue de Dr Roux, Institut Pasteur, Paris, France
Président: Jean CHALOPIN - Directeur scientifique: Pierre CHARNEAU

References

Douguet L*, Fert I*, Lopez J*, Vesin B*, Le Chevalier F, Moncoq F, Authié P, Nguyen TM, Noirat A, Névo F, Blanc C, Bourgine M, Hardy D, Anna F, Majlessi L[£], Charneau P[£]. (2023) Full Eradication of Pre-clinical Human PapillomaVirus-Induced Tumors by a Lentiviral Vaccine. *EMBO Mol Med*. *Co-first authors, [£]Senior authors. https://www.embopress.org/doi/full/10.15252/emmm.202317723

Ramos da Silva J, Bitencourt Rodrigues K, Formoso Pelegrin G, Silva Sales N, Muramatsu H, de Oliveira Silva M, Porchia B, Moreno ACR, Aps L, Venceslau-Carvalho AA *et al* (2023) Single immunizations of self-amplifying or non-replicating mRNA-LNP vaccines control HPV-associated tumors in mice. *Sci Transl Med* 15: eabn3464