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PRESS RELEASE

The biotech TheraVectys develops its first intranasal vaccine candidate "Lenti-Covid" which generates an effective mucosal immunity

The biotech TheraVectys has just demonstrated the efficacy of its lentiviral vaccine candidate "Lenti-COVID", administered as a booster dose by nasal route, six months after the primary vaccination with a messenger RNA vaccine. This intranasal booster induces protective immunity in the respiratory mucosa. These results pave the way for an innovative vaccine strategy to reduce the viral transmission chain. These results are published in the journal *Molecular Therapy*. <https://www.sciencedirect.com/science/article/pii/S1525001622002453?via%3Dihub>

As the COVID-19 pandemic continues, as new variants of concern of SARS-CoV-2 emerge, and as the adaptive immunity induced by the first-generation COVID-19 vaccines weakens, the development of a vaccine that can sustainably block transmission of the virus against emerging variants is needed. Furthermore, if COVID-19 becomes endemic, the need for more effective second-generation vaccines will remain important.

Vaccination with Lenti-COVID by the nasal route generates not only antibodies, but also very strong T-cell responses in the respiratory mucosa, i.e., at the entry point of SARS-CoV-2 in the body. In contrast to antibody responses, which lose their effectiveness against variants quite easily, T-cell responses target virus components that remain invariant or are only slightly variable in SARS-CoV-2 variants. This cellular immunity thus induces a broad-spectrum and long-term protection. Mucosal immunity is considered the most effective in reducing SARS-CoV-2 transmission, according to numerous studies ¹.

The lentiviral vaccine vector is particularly well suited to this immunization route. In previous preclinical studies, TheraVectys has demonstrated the strong performance of this vaccine strategy against SARS-CoV-2 in animal models, when used as an intramuscular immunization followed by an intranasal booster. **In these studies, the lentiviral vaccine vector is well tolerated, does not induce an inflammatory response, and does not multiply in the vaccinated host. Nasal booster vaccination with the Lenti-COVID vaccine candidate protects, not only the respiratory system, but also the central nervous system** ^{2,4}.

In a recently published work, TheraVectys studied the immunity of animals initially vaccinated in a prime-boost regimen with a messenger RNA vaccine and in which immunity had waned four months later. In these animals, a booster vaccination was performed with either the intranasal Lenti-COVID vaccine candidate or a third dose of intramuscular messenger RNA vaccine. In both cases, IgG antibody responses in the blood were amplified. **However, only Lenti-COVID administered intranasally induced major players of mucosal immunity in the airways: (i) mucosal anti-Spike IgA, and (ii) memory-type, lung-resident B-cells able to produce antibodies and T-cells able to kill infected cells.**

Induction of these major players of mucosal immunity by Lenti-COVID leads to complete pulmonary protection against Delta and Omicron variants, demonstrating the suitability of the Lenti-COVID vaccine candidate as an intranasal booster against COVID-19 ⁵.

A clinical phase will have to be initiated to confirm the safety and efficacy of this approach in humans.

About TheraVectys

TheraVectys, a biotech specialized in immunotherapy, is the result of more than 20 years of research on lentiviral vectors and provides an innovative technology in the field of vaccinology.

The research work is conducted under the scientific direction of **Pierre CHARNEAU**, inventor and pioneer of the lentiviral technology, and **Laleh MAJLESSI**, research director in immunology, within the Pasteur-TheraVectys Joint Laboratory.

Christian BRECHOT, former General Director of the Institut Pasteur and INSERM, is Medical Director of TheraVectys.

TheraVectys' work is based on a proprietary platform to deliver T-cell vaccines in response to critical unmet medical needs.

Theravectys' technology and its global license area have an almost unlimited number of applications in infectious diseases, cancers and viral cancers, and are creating a revolution in the field of 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.

References

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